ORDER NO. HAD. 8704113C9

Service Manual

Compact Disc Player

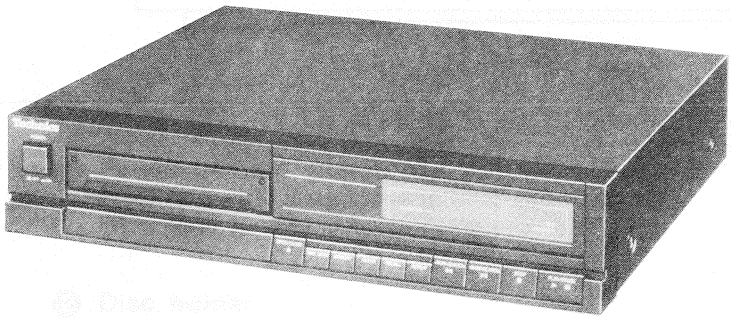
COMPACT disc DIGITAL AUDIO

DIGITAL

SL-PJ22

Color

(K).....Black Type



Area

Color	Areas
(K)	[E] ..... Continental Europe.
(K)	[Ei] ..... Italy.
(K)	[EG] ... F.R. Germany.
(K)	[EB] .... Belgium.
(K)	[EK] .... United Kingdom.
(K)	[EF] .... France.
(K)	[EH] .... Holland.
(K)	[XL] .... Australia.
(K)	[XA] .... Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	[PA] .... Far East PX.
(K)	[PE] .... European Military.
(K)	[PC] .... European Audio Club.
(K)	[XB] .... Saudi Arabia.

SPECIFICATIONS

■ Audio

Number of channels: 2 (left and right,stereo)
Frequency response: 2 ~ 20,000 Hz (EIAJ)
Dynamic range: 96dB
S/N ratio: 96dB (EIAJ)
Harmonic distortion: 0.003% (1kHz,0dB)
Total harmonic distortion: 0.004% (1kHz,0dB) (EIAJ)
Channel separation: 90dB (EIAJ)
Wow and flutter: Below measurable limit
Low-pass filter: High-resolution digital filter

■ Signal Format

Sampling frequency: 44.1kHz
Correction system: Technics Super Decoding Algorithm
D-A conversion: 16-bit linear

■ Pickup

Access time: 1 second (access to the last track)
Light source: Semiconductor laser
Wavelength: 780nm
Traverse system: High-speed linear access system

■ Functions

Automatic play: All tracks
Direct access play: Track number
Repeat play: Entire disc or programmed tracks
Search: Forward/backward track skip
Forward/backward manual search
Program play: For up to 20 selections
CD edit recording
Display: Total tracks (up to 99)
Programmed track
Current track
Time display (min.,sec.)
Time modes display
Indicators: Music matrix (15)
Overflow indicator
Disc indicator
Edit indicator
Tape side A/B indicator
Repeat indicator
Play indicator
Pause indicator
Disc loading: Motor-driven horizontal type
Synchro recording terminal: 1/8 inch

Technics

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Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

■ General

Power supply: For United Kingdom and Australia: AC240V,50Hz
For Continental Europe: AC220V,50Hz
For Others: AC110~127V/220~240V,50/60Hz

Power consumption: 10W
Output voltage: 2V (at 0dB) (EIAJ)
Output impedance: Approx. 600Ω
Load impedance: More than 10kΩ

Dimensions (W×D×H): 36 X 28 X 7.7 cm
<When disc holder is opened: 42 cm (D)>
Weight: 3.3kg

Specifications are subject to change without notice.
Weight and dimensions are approximate.
Measured by EIAJ (CP-307).

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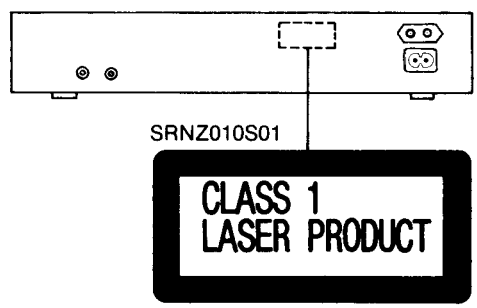
■ PRECAUTION OF LASER DIODE

Caution: This product utilizes a laser diode.
ADVARSEL: I dette a apparat anvendes laser.



SRNZ010S01

Obs:
Apparaten innehåller laser Komponent av höger laserklass än klass 1.

• Use of caution labels

Note: ○ Mark is used, × Mark is not used.

Areas	SRNZ010S01	SRNZ010S02	SQWD48	SQWD47
[E]	○	○	○	○
[EK], [XL], [EG], [EB], [EH], [EF], [Ei], [XA], [XB]	○	○	×	○

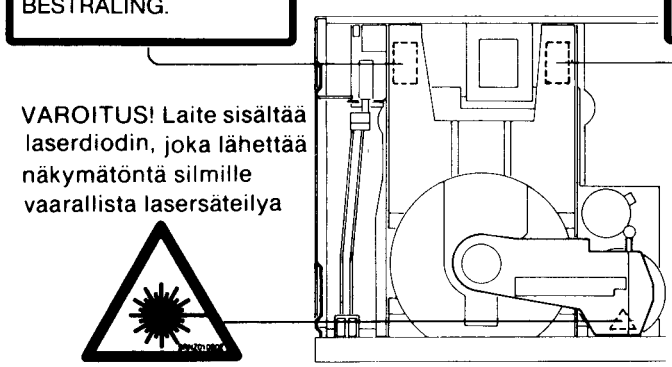
SQWD48

ADVARSEL - Usynligt laserlys udstråles ved åbning. UNDGÅ DIREKTE BESTRÅLING.

SQWD47

DANGER-Invisible laser radiation when open. AVOID DIRECT EX—POSURE TO BEAM.

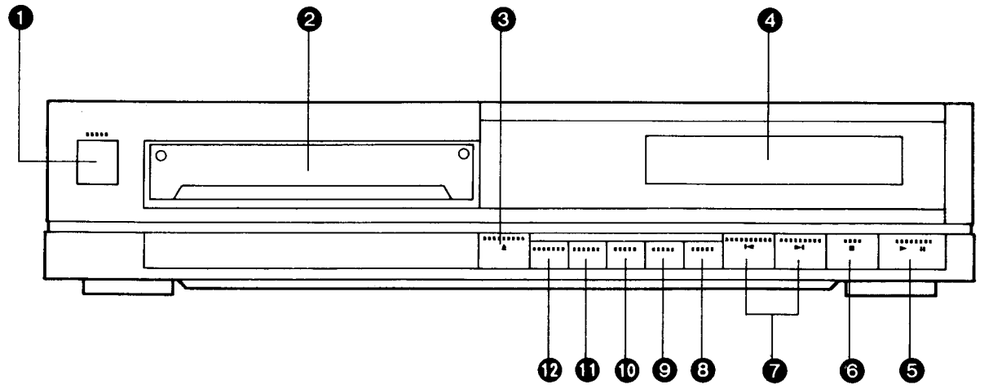
VAROITUS! Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilya



SRNZ010S02

■ LOCATION OF CONTROLS

Front Panel



❶ Power (mains) switch
Press (▙▁▁▟) to switch power (mains) on.
Press again (▟▁▁▙) to switch power (mains) off.

❷ Disc holder
The disc is inserted in this holder with the label side up.

❸ Open/close button
Press this button to open and close the disc holder.

❹ Display panel
(Please refer to items ④A to ④F.)

❺ Play/pause button
This button is used for the following three operations.
1. If the button is pressed while the unit is in the stop mode or in the pause mode, play begins and the play indicator illuminates.
2. If the button is pressed during play, the unit goes to the pause mode, and the pause indicator illuminates.
3. If the synchro-recording cord is properly connected, pressing this button when the unit is in the stop or pause modes causes the amplifier's input selector to switch to "CD" automatically.

Pickup:
The pickup is a laser device that reads the information on the disc surface. The pickup moves across the disc as the disc is played, but it is not visible from outside the cabinet.

Pause mode:
Play is stopped, but the pickup remains where it was at the time when the play/pause button was pressed. The disc rotates while the unit is in the pause mode.

❻ Stop button
Press this button to stop disc play and cancel all previous settings.
Note:
When this button is pressed, the unit returns to the stop mode.

Stop mode:
In the stop mode, the pickup is at the beginning of the first track and the display shows the total number of tracks and total playing time of the disc.
(The disc does not rotate.)

❼ Forward and backward skip/search buttons
These buttons are used for the following five operations.

1. **To program track numbers before starting play (program play).**
   Press either button before starting play.

2. **To start play from a specific track (direct access play).**
   Press either button before starting play.

3. **To skip to the beginning of a specific track (skip play).**
   Press either button for an instant (less than one second) during play or the pause mode.
   (The number of tracks skipped is the same as the number of times one of these buttons is pressed.)

4. **To move the pickup forward or backward to a desired point (manual search play).**
   Keep either button pressed and release it when it reaches the desired point.
   The pickup moves slowly at first and then rapidly if one of the skip/search buttons is held down for more than about 3 seconds.

5. **To specify playing time (min.) (preset edit play).**

❽ Repeat button
Press this button to activate the repeat mode.
(The repeat indicator illuminates.)
Press again to cancel the repeat mode.

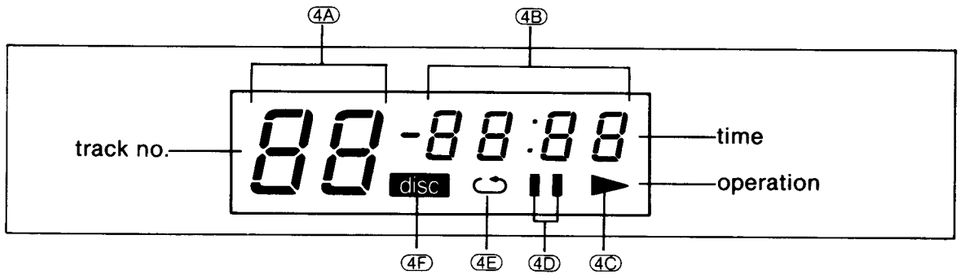
❾ Recall button
Press this button to display the program play sequence in the memory.
When this button is pressed, the tracks stored in the memory for program play are shown one by one.

❿ Clear button
Press this button to cancel the programmed track when the unit is in the stop mode.
Each time this button is pressed, the previous entry is cancelled.

⓫ Memory button
Press this button to enter track numbers before starting play (program play).
(A maximum of 20 selections can be programmed.)
- The letter "F" (FULL) will be displayed if more than 20 memory selection are attempted.

⓬ Time mode select button
Use this button to select the desired time display mode.
① Disc remaining playing time.
② Track number and remaining playing time of the current track.
③ Playing time from the beginning of the first track.
④ Track number and elapsed playing time from the beginning of the current track.

Display panel



④A Track number display (track)
Track numbers (up to 99) are shown here.

④B Time display
This display shows four time modes and programmed order

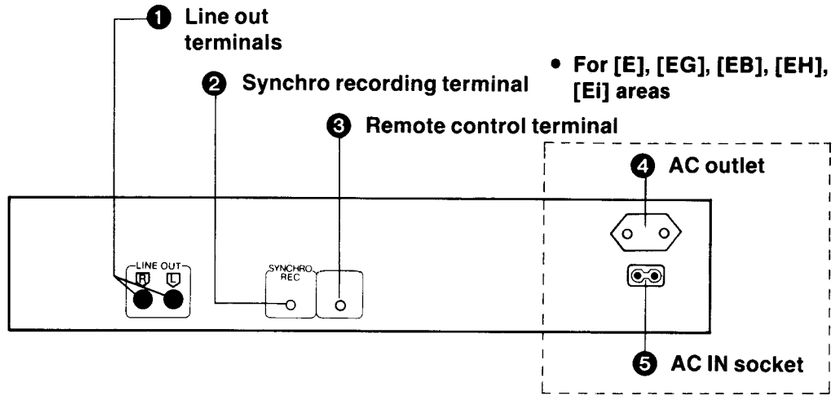
④C Play indicator (▶)
Illuminates when the play mode is activated and goes out when the play is stopped.

④D Pause indicator (❚❚)
Illuminates when the pause mode is activated and goes out when the pause mode is cancelled.

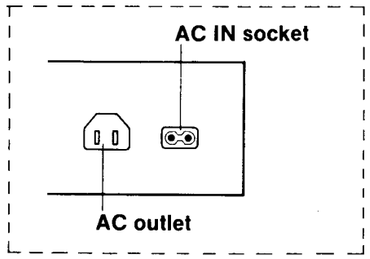
④E Repeat indicator (↻)
Illuminates when the repeat mode is activated and goes out when the repeat mode is cancelled.

④F Disc indicator (disc)
Flashes on and off when the disc holder is opening or closing.
Illuminates when a disc is in the holder (if power is on) and the disc holder is closed.

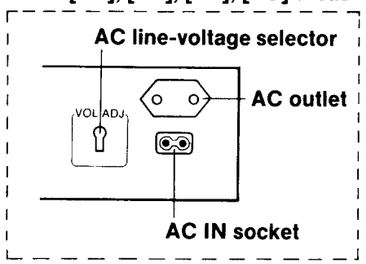
Rear panel



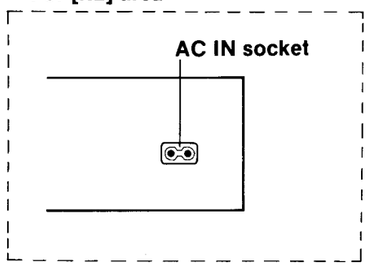
• For [EK] area



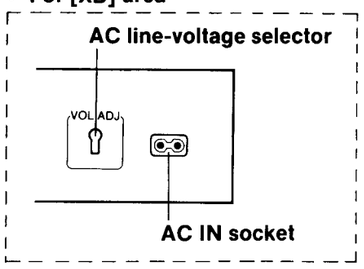
• For [XA], [PA], [PE], [PC] areas



• For [XL] area



• For [XB] area



1 Line out terminals (LINE OUT)

These are the audio output terminals.

- Connect the line out terminals to the CD or AUX terminals on your amplifier or receiver.
- Do not connect the line out terminals to the PHONO terminals of your amplifier or receiver.

2 Synchro recording terminal (SYNCHRO REC)

- Connect the synchro recording cord to the CD synchro recording terminal of your amplifier.

■ Synchro recording function

Recording can be synchronized with the beginning and end of disc play and pause operation.

Note:
This terminal can be used only with Technics amplifiers or cassette decks having a synchro recording terminal for a CD player. (Contact your dealer for details.)

3 Remote control terminal (REMOTE)

***Note:** This terminal can be used only with Technics amplifiers or cassette decks (or graphic equalizers) having a remote control terminal for a CD player. (Contact your dealer for details.)

4 AC outlet

■ "SWITCHED" outlet

Power (mains) is connected by power (mains) switch of the amplifier or tuner. Audio equipment rated up to 50 W can be connected.

5 AC IN socket (~ AC IN)

Connect this socket to a wall socket or an AC outlet using the power (mains) cord.

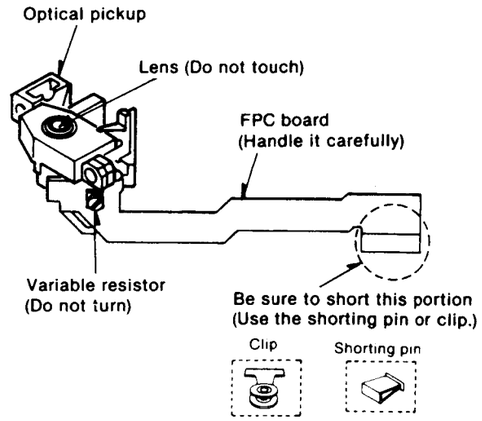
[The configuration of AC power (mains) plug may differ according to the area.]

■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the optical pickup.

• Handling of optical pickup

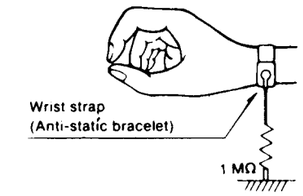
1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. **(FPC board)**
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board. **(FPC board)**
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

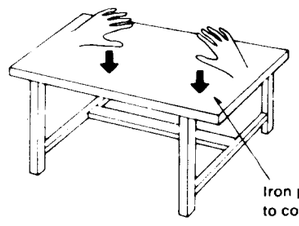


• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

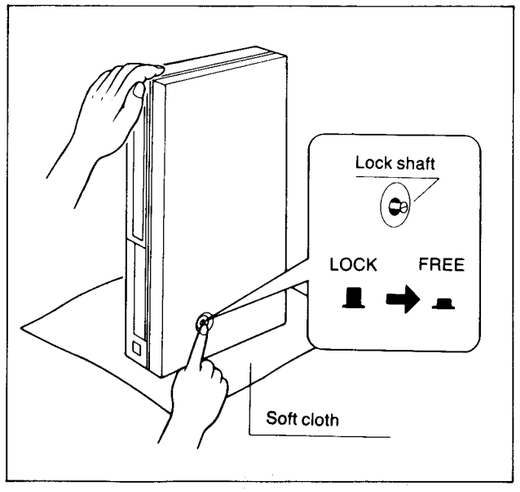
Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.





■ BEFORE USING THIS UNIT

1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (▙ → ▄).



NOTE:
IF THE UNIT IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:
1) Remove the disc from the holder.
2) Pull the lock shaft to the out (LOCK) position (▄ → ▙).
CAUTION:
Do not transport the unit without locking the lock shaft.
SEVERE DAMAGE WILL RESULT.

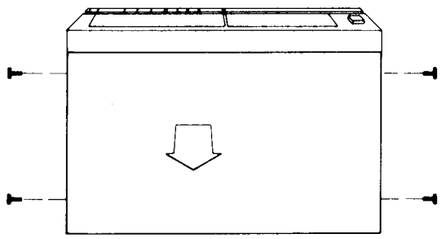
■ DISASSEMBLY INSTRUCTIONS

CAUTION:
- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When doing the job, removing the cabinet and disc clamper of this unit, be sure to turn the power supply off.

Ref. No. 1 — How to remove the cabinet

Procedure 1

- Remove the 4 setscrews.

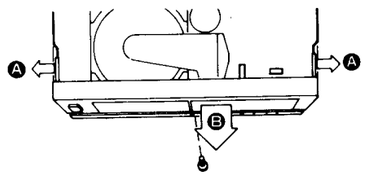


Note: When doing the job, Lock the lock shaft at the bottom of the unit. (See page 6.)

Ref. No. 2 — How to remove the front panel

Procedure 1 ➧ 2

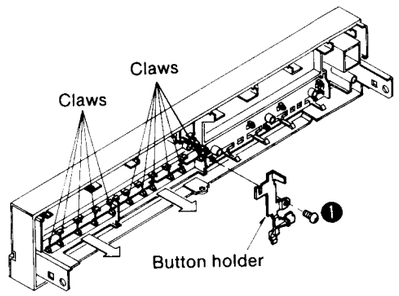
1. Remove the screw.
2. Slightly pull the tabs outward (arrows Ⓐ).
3. Remove in the direction of arrow Ⓑ.



Ref. No. 3 — How to remove the operation buttons

Procedure 1 ➧ 2 ➧ 3

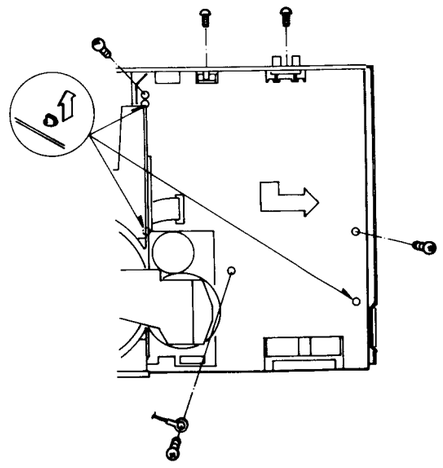
- **How to remove the operation buttons**
1. Remove the screw ❶ and remove the holder.
2. Release the 11 claws.



Ref. No. 4 — How to remove the main P.C.B.

Procedure 1 ➧ 2 ➧ 4

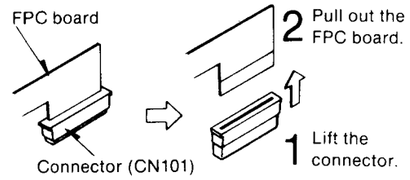
1. Remove the 5 screws.
2. Lift up the P.C.B. to remove it from the chassis tabs.
3. Remove in the direction of the arrow.



How to check the main P.C.B.

- When checking the soldered surface of the main P.C.B. and replacing the parts, do as shown.

1. Remove the main P.C.B.
2. Remove the FPC board (CN101).

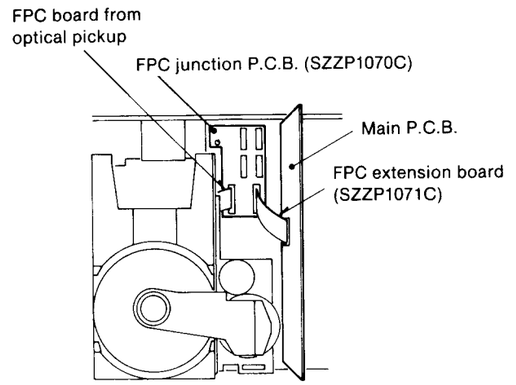


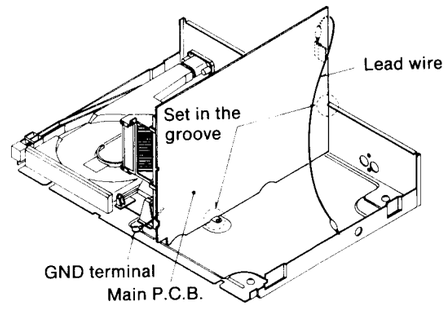
Caution: Insert the short pin into the FPC board in order to prevent breakdown of laser diode. (See page 6.)

3. Connect FPC board from optical pickup to FPC junction P.C.B. (SZZP1070C).

Caution: Cover the foil of the FPC junction P.C.B. with friction tape to prevent a short-circuit between the foil and the chassis.

4. Connect FPC extension board (SZZP1071C) to FPC junction P.C.B. and CN101 of main P.C.B.
5. Place the main P.C.B. as shown in the figure.



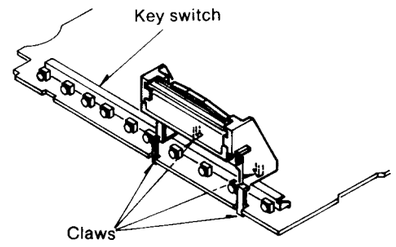


Cautions:
- Be sure to connect the P.C.B. ground terminal (line out terminal) and chassis with a lead wire.
- Connect the ground wire of loading base to the chassis.

Ref. No. 5 — How to remove the FL (display)

Procedure 1 ➧ 2 ➧ 4 ➧ 5

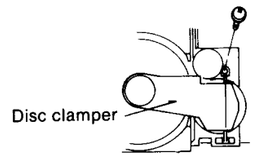
1. Unsolder the terminals of FL.
2. Remove FL from the P.C.B.
3. Release the claws of FL holder and remove it to remove the switches.



Ref. No. 6 — How to remove the disc clamper

Procedure 1 ➧ 6

- Remove the screw.



Ref. No. 7 — How to remove the loading base

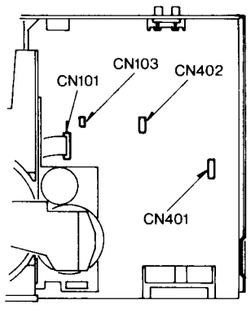
Procedure 1 ➧ 2 ➧ 7

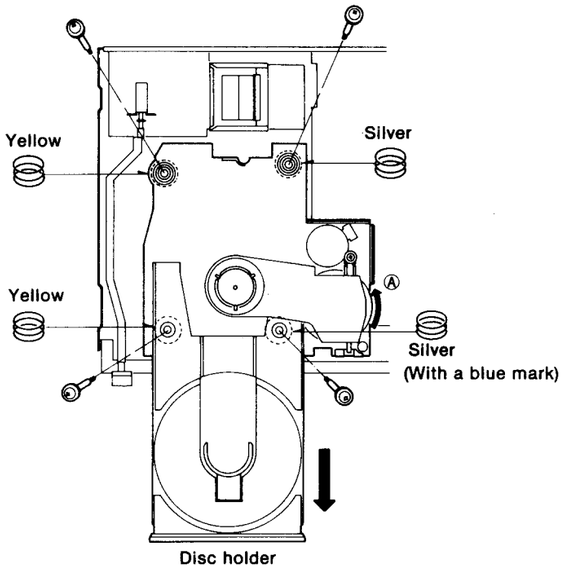
Refer to the optical pickup handling precautions (See page 6).

1. Turn the drive gear in the direction of arrow Ⓐ, and shift the disc holder forward.
2. Remove the 4 setscrews.

Caution: Note the color of each spring, they must be reinstalled in their original positions.

3. Pull out the 3 connectors (CN103, CN401, CN402).
4. Remove the FPC board (CN101).

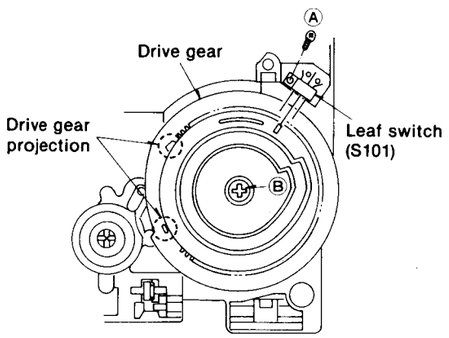




Ref. No. 8 — How to remove the disc holder (disc tray)

Procedure 1 ➧ 2 ➧ 6 ➧ 8

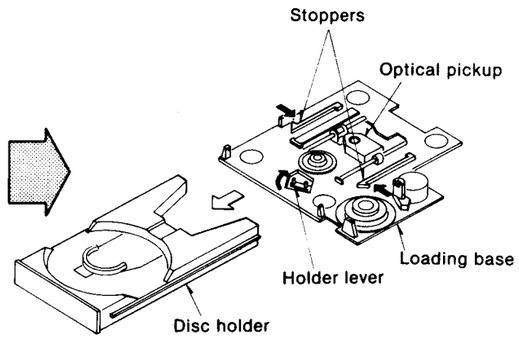
- **Set the drive gear as shown below.** (Turn it completely to the right, then turn it to the left by about 20° so that the drive gear teeth or projection will not touch the rack of the disc holder.)



- **To remove the drive gear**

Remove the screw Ⓐ of the leaf switch (S101), then remove the drive gear setscrew Ⓑ.

1. Push the holder lever backward, (From underneath the loading base.)
2. Pull the disc holder and bend the 2 claws of the disc holder stopper of the loading base toward the optical pickup.
3. Further pull out the disc holder to remove it.



- **Caution for fitting**

When fitting the disc holder, make the drive gear as shown on the left, and then insert the disc holder along the guide of the loading base. After inserting the disc holder cmpletely, turn the drive gear to the right completely.

Ref. No. 9 — How to remove the optical pick up

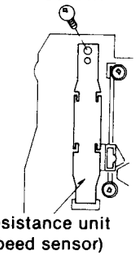
Procedure 1 ➧ 2 ➧ 7 ➧ 8 ➧ 9

Refer to the optical pickup handling precautions (See page 6).

- Remove in the numerical order shown.

Note: Lock the lock shaft at the bottom of the unit. (See page 6.)

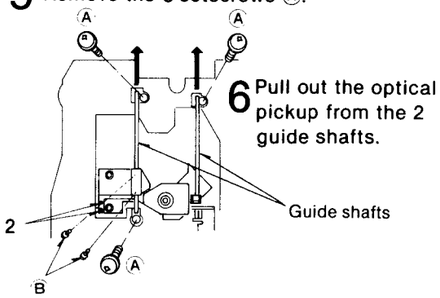
1 Remove the screw.



2 Remove the resistance unit.

3 Unsolder the 2 terminals.

5 Remove the 3 setscrews Ⓐ.



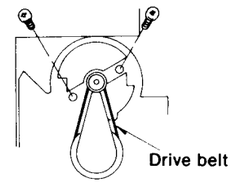
4 Remove the 2 screws Ⓑ. (Underneath)

Ref. No. 10 — How to remove the drive motor

Procedure 1 ➧ 2 ➧ 7 ➧ 10 ➧

- Remove in the numerical order shown.

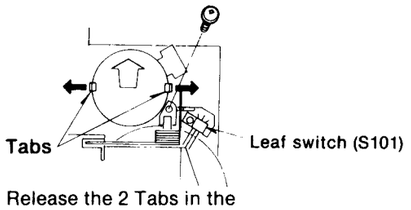
2 Remove the 2 screws.



1 Remove the drive belt.

5 Lift up the drive motor.

3 Remove the screw.



4 Release the 2 Tabs in the direction of the arrows.

Ref. No. 11 — How to remove the power transformer

Procedure 1 ➧ 11

1. Remove the connector (CN11).
2. Remove the 2 screws.
3. Unsolder the 2 terminals from the AC outlet.
4. Lift the power transformer to remove it from the chassis tab. (arrow Ⓐ)
5. Remove the power source P.C.B. in the direction of the arrow Ⓑ.

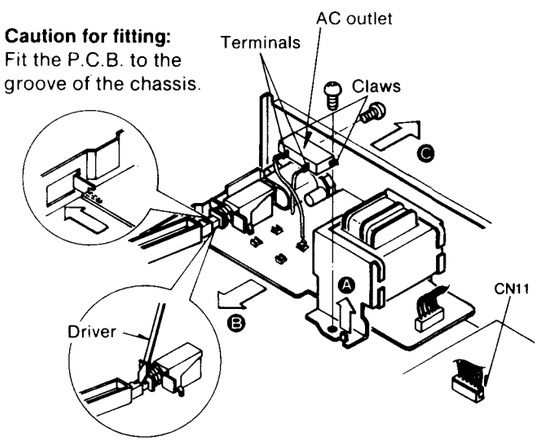
- **How to remove the AC outlet**

1. Unsolder the 2 terminals from the AC outlet.
2. Release the 2 claws.
3. Remove in the direction of the arrow Ⓒ.

- **How to remove the power switch rod**

1. Set the power switch in "OFF" position.
2. Remove the power switch rod by using a screwdriver.

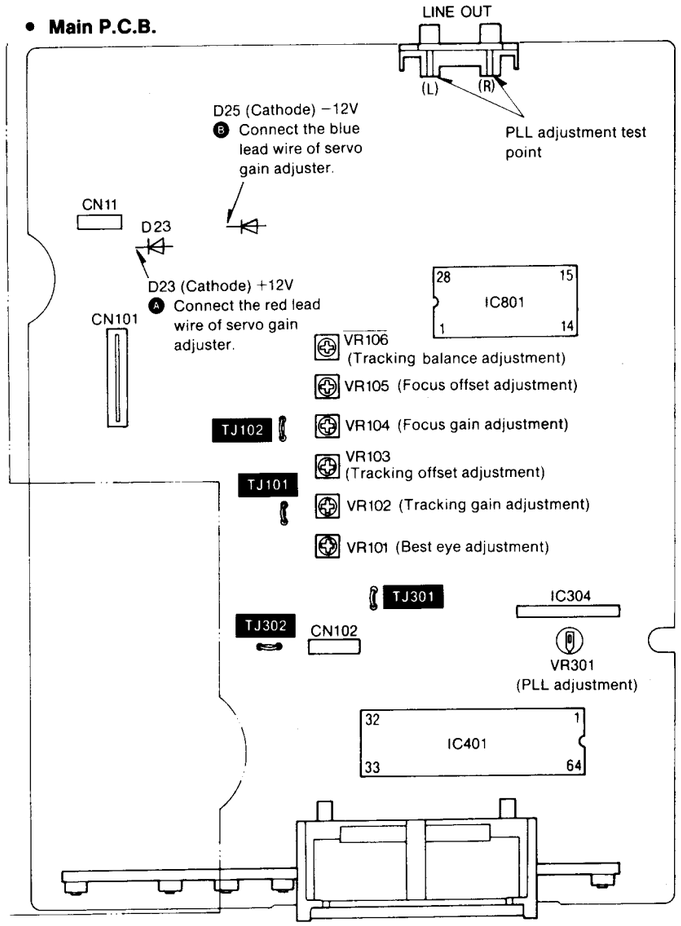
Caution for fitting:
Fit the P.C.B. to the groove of the chassis.



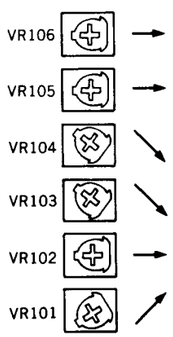
■ MEASUREMENTS AND ADJUSTMENTS

ADJUSTMENT POINTS

• **Main P.C.B.**



• **Temporary setting of each VR**



ELECTRICAL ADJUSTMENT

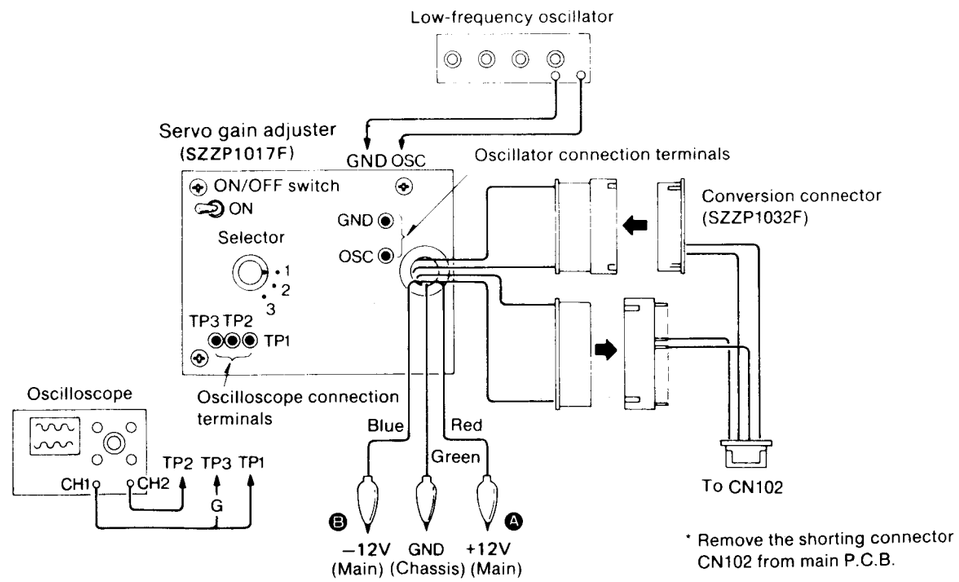
Measuring Instruments and Special Tools

- Servo gain adjuster (SZZP1017F)
- Test discs
  Test disc(SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
  Black band disc (SZZP1057C)
- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Low frequency oscillator
- Conversion connector(SZZP1032F)

Adjustment Procedure

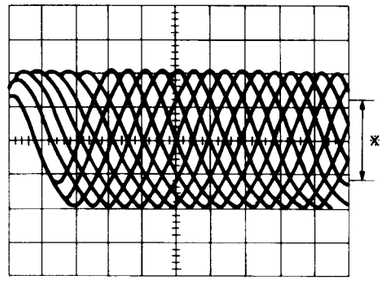
Step 1: Remove the cabinet. (Refer to page 7.)
↓
Step 2: Make the temporary setting of each VR. (Refer to page 11.)
↓
Step 3: Best eye (PD balance) adjustment. (Refer to page 13.)
↓
Step 4: Connect the servo gain adjuster. (Refer to page 12.)
↓
Step 5: Focus gain adjustment. (Refer to page 13.)
↓
Step 6: Tracking gain adjustment. (Refer to page 13.)
↓
Step 7: Temporary adjustment of focus and tracking offset. (Refer to page 14.)
↓
Step 8: Focus offset adjustment. (Refer to page 14.)
↓
Step 9: Tracking offset adjustment. (Refer to page 14.)
↓
Step 10: Connect the servo gain adjuster. (Refer to page 12.)
↓
Step 11: Tracking offset balance adjustment. (Refer to page 14.)
↓
Step 12: PLL adjustment. (Refer to page 15.)
↓
Step 13: Check of operation after adjustment. (Refer to page 15.)

Connection of Servo Gain Adjuster



BEST EYE(PD BALANCE) ADJUSTMENT

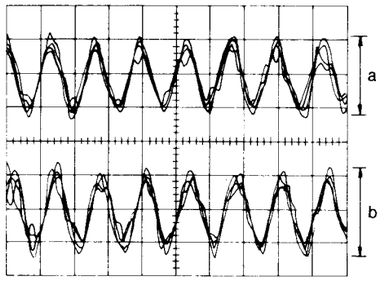
1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5µsec.
INPUT.....AC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
3.Set the player to the play mode.
4.Adjust **VR101** so that the eye pattern of RF signal is stretched to maximum.
5.Turn **OFF** the power switch of the player.



*Most stretched eye pattern

FOCUS GAIN ADJUSTMENT

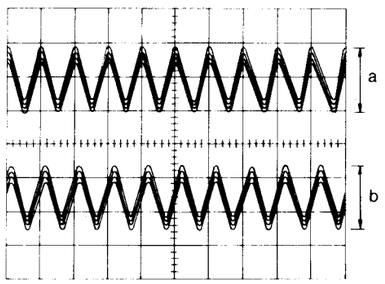
1.Connect the servo gain adjuster. (Refer to page 12.)
2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON.**
3.Set the low frequency oscillator to a frequency of **750Hz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
4.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(TP3 is the ground terminal.)
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....1msec.
INPUT.....DC
5.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
6.Set the player to the play mode.
7.Set the selector switch of the servo gain adjuster from **"2" to "3".**
8.**750Hz** signals will be displayed on the oscilloscope. Adjust **VR104** until the waveform amplitudes of both channels are equal.
9.Shift the selector switch of the servo gain adjuster from **"3" to "2".**
10.Turn **OFF** the power switch of the player.



*Make a=b

TRACKING GAIN ADJUSTMENT

1.Set the low frequency oscillator to a frequency of **1.0kHz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
2.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(TP3 is the ground terminal.)
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....1msec.
INPUT.....DC
3.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4.Set the player to the play mode.
5.Set the selector switch of the servo gain adjuster from **"2" to "1".**
6.**1.0kHz** signals will be displayed on the oscilloscope. Adjust **VR102** until the waveform amplitudes of both channels are equal.
7.Shift the selector switch of the servo gain adjuster from **"1" to "2".**
8.Turn **OFF** the power switch of the player.
9.Disconnect the servo gain adjuster, and insert the shorting connector of CN102 to the original position.



*Make a=b

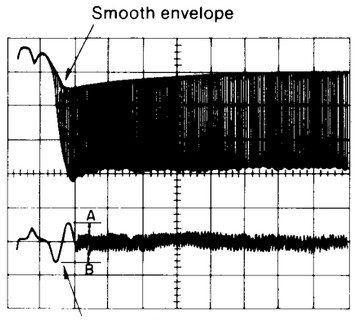
TEMPORARY ADJUSTMENT OF FOCUS AND TRACKING OFFSET

(Temporary adjustment of focus offset)
1.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.After the player read TOC , adjust **VR105** so that the voltage waveform center on the oscilloscope is **0mV.**

(Temporary adjutment of tracking offset)
1.Connect CH1 of the oscilloscope to **TJ101** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.After the player read TOC , adjust **VR103** so that the voltage waveform center on the oscilloscope is **0mV.**

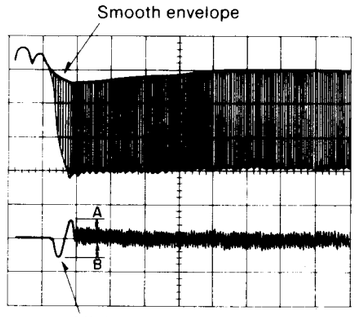
FOCUS OFFSET ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Connect CH2 of the oscilloscope to **TJ102** (+) and **TJ302** (-)of the main P.C.B.
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....0.5msec.
INPUT.....AC(CH1),DC(CH2)
MODE.....NORM
(Triggering via CH1)
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.Set the player to the play mode.
4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR105** , so that the waveform around the triggering point becomes as shown in the illustration.



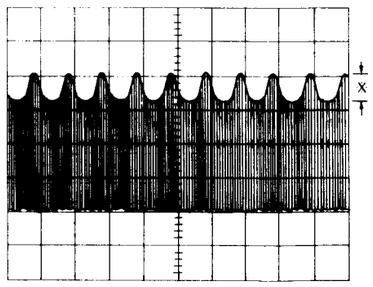
TRACKING OFFSET ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Connect CH2 of the oscilloscope to **TJ101** (+) and **TJ302** (-)of the main P.C.B.
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....0.5msec.
INPUT.....AC(CH1),DC(CH2)
MODE.....NORM
(Triggering via CH1)
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.Set the player to the play mode.
4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR103** , so that the waveform around the triggering point becomes as shown in the illustration.



TRACKING OFFSET BALANCE ADJUSTMENT

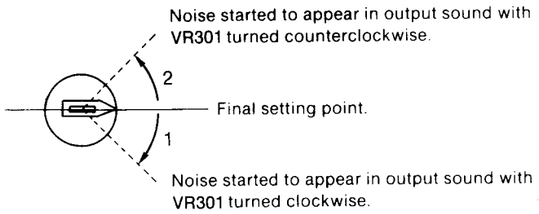
1.Connect the servo gain adjuster. (Refer to page 12.)
2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON.**
3.Set the low frequency oscillator to a frequency of **1kHz** and an output voltage of **200mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
4.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-)of the main P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5msec.
INPUT.....AC
5.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
6.Set the player to the play mode.
7.Set the selector switch of the servo gain adjuster from **"2" to "1".**
8.Adjust **VR106** so that the output waveform is as shown **(jitter is minimized).**
9.Shift the selector switch of the servo gain adjuster from **"1" to "2".**
10.Turn **OFF** the power switch of the player.
11.Disconnect the servo gain adjuster, and insert the shorting connector of CN102 to the original position.



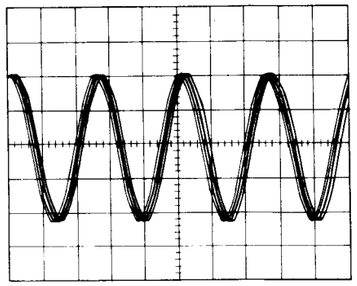
*Jitter should be minimized.

PLL ADJUSMENT

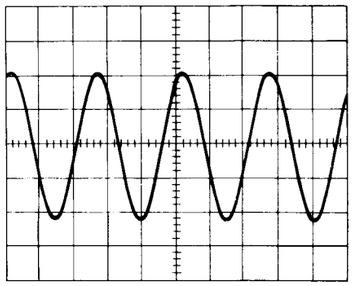
1.Connect CH1 of the oscilloscope to the **LINE OUT terminal** (either of Lch or Rch) and **ground.**
Oscilloscope setting:VOLT.....1V
SWEEP.....1msec.
INPUT.....DC
2.Turn **ON** the power switch of the player and insert the test disc(SZZP1054C).
3.Play track No.6 (wedge 0.7 mm) of the test disc.
4.Check the waveform displayed on the oscilloscope and adjust **VR301** in the following steps.
Step 1. Turn **VR301** clockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 2. Turn **VR301** counterclockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 3. Set **VR301** in the middle between the points observed in the above steps " 1 " and " 2 " .


Noise started to appear in output sound with VR301 turned counterclockwise.
2
Final setting point.
1
Noise started to appear in output sound with VR301 turned clockwise.

• NG



• OK



CHECK OF PLAY OPERATION AFTER ADJUSTMENT

Check of skip search
1.Play an ordinary disc.
2.Press the skip button and verify skip search operation (forward and reverse).

Check of manual search
1.Play an ordinary disc.
2.Press the manual search button and verify that smooth manual search can be performed at low and high speeds (forward and reverse).

Check of playability
1.Play the test disc (SZZP1054C).
2.Play the track No.6 (wedge 0.7 mm) and verify that there is no skip sound or noise.
3.Play the track No.13 (black dot 0.7 mm) and verify that there is no skip sound or noise.

OPTICAL PICKUP ADJUSTMENT

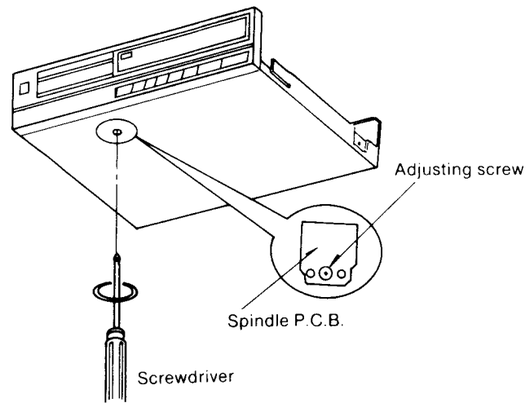
Measuring Instruments and Special Tools
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Test discs
  Test disc (SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
- Hexagonal wrench (SZZP1044C....1.5mm)
- Screw lock paint (RZZ0L01)

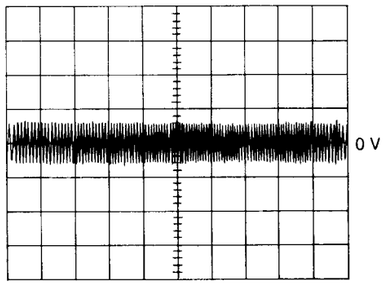
Adjustment Procedure
- If the optical pickup is replaced , adjust it according to the following procedure.

Step 1: Assemble the set to make it ready for power ON check.
↓
Step 2: Make the temporary setting of each VR. (Refer to page 11.)
↓
Step 3: Turntable height adjustment. (Refer to page 16.)
↓
Step 4: Mechanical adjustment. (Refer to page 16.)
↓
Step 5: Electrical adjustment. (Refer to page 12.)

TURNTABLE HEIGHT ADJUSTMENT

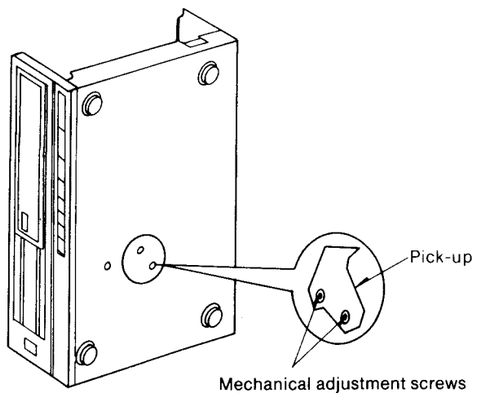
1.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC
2.Set the oscilloscope to DC zero balance.
3.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4.Set the player to the play mode.
5.Turn the **adjusting screw** at the bottom of the spindle motor drive P.C.B. with a flat screwdriver so that the waveform is balanced at **0 ± 50mV.**
6.Turn **OFF** the power switch of the player.
7.After the adjustment , apply **screw lock paint(RZZ0L01)** to the adjusting screw.

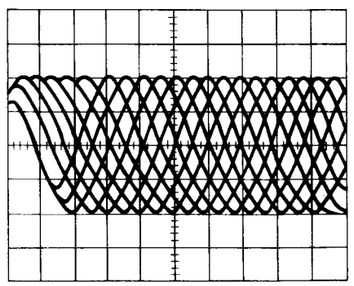




MECHANICAL ADJUSTMENT

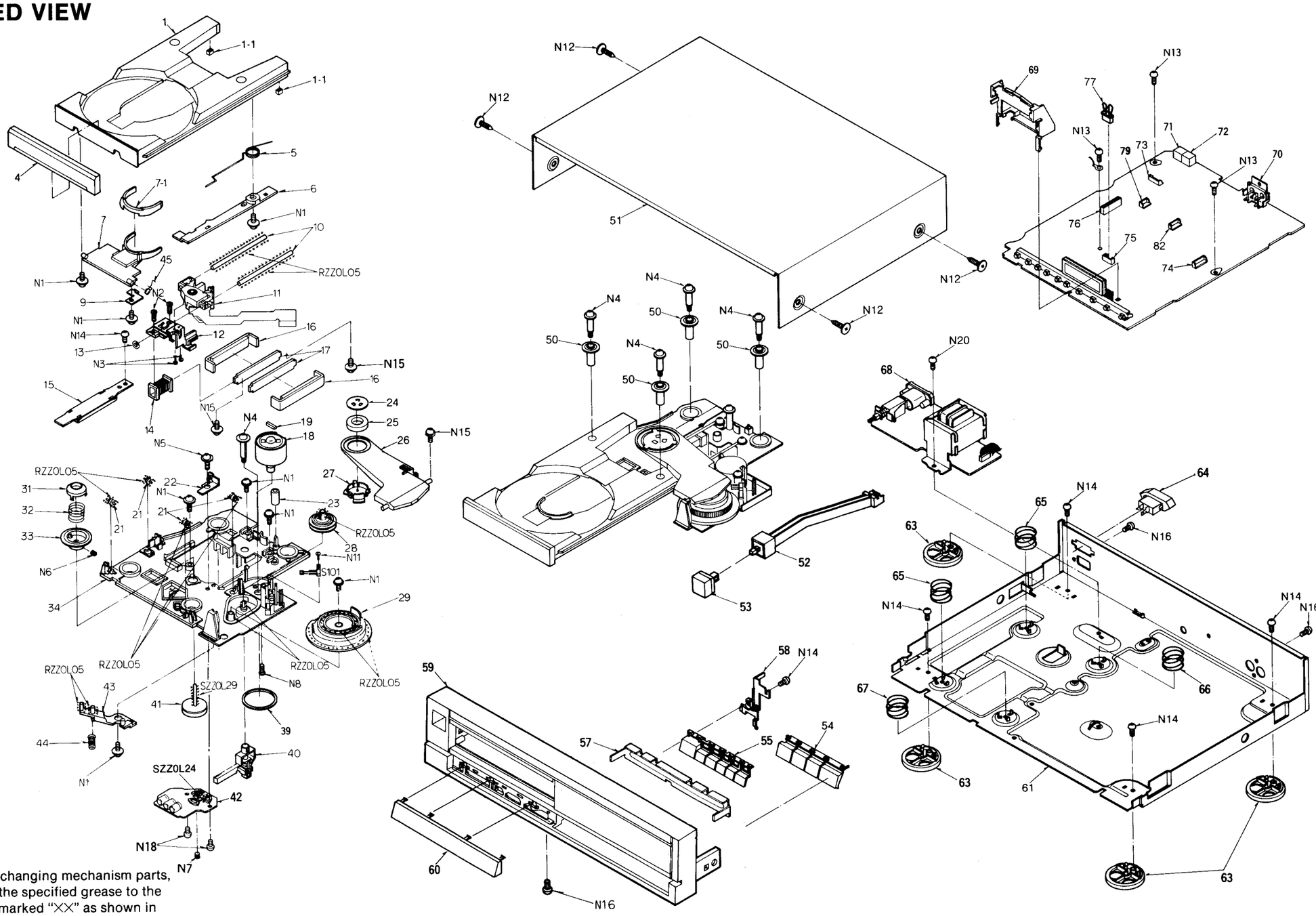
1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5µsec.
INPUT.....AC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1056C).
3.Play track No.9 of the test disc.
4.Monitoring RF signal on the oscilloscope, adjust the **two adjusting screws** alternately so that the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.
5.Turn **OFF** the power switch of the player.
6.After the adjustment , apply **screw lock paint(RZZ0L01)** to the adjusting screws.





Note: The mechanical adjustment screws have been already locked with screw lock paint at the factory. It might be hard to turn them.

■ EXPLODED VIEW



Note: When changing mechanism parts, apply the specified grease to the areas marked "XX" as shown in the drawing.

| | | |

■ REPLACEMENT PARTS LIST

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS			
IC1, IC2 ⚠ (EK, XA, XB) (PA, PE, PC)	SVIFU38	001 061 3400 7	I.C.PROTECTOR
IC11, IC12	SVIFU15	001 060 8433 3	I.C.PROTECTOR
IC13	M5236L	001 060 5358 9	I.C., REGULATOR
IC101	AN8370S	001 060 8399 8	I.C., SERVO
IC102	MN6636S	001 061 3044 7	I.C., ANALOG SW.
IC103, IC104	AN6554NS	001 060 4860 4	I.C., OPERATION AMP.
IC105 (EK, XA, XB) (PA, PE, PC)	SVIFU10	001 060 8432 4	I.C.PROTECTOR
IC301	MN6617	001 060 8411 9	I.C., SIGNAL PROCESSING
IC302	MN6618A	001 061 3043 8	I.C., DIGITAL FILTER
IC303	SVICXK5816M	001 061 3298 7	I.C., 16K RAM
IC304	EHDGA1243	001 061 3036 7	I.C., PLL
IC401	MN15261PDW	001 061 4826 1	I.C., SYSTEM CONTROL
IC402	SVIM5218FP	001 061 5321 7	I.C., OPERATION AMP.
IC403	MN1280-R	001 060 8669 5	I.C., RESET
IC404	MN1550PDT	001 061 3639 6	I.C., MICROCOMPUTER
IC501	AN8290S	001 061 3034 9	I.C., SPINDLE DRIVE
IC801	SVIPCM54HP-1	001 061 3098 3	I.C., D/A CONVERTER
IC802	SVIUPD4053G1	001 060 8804 6	I.C., ANALOG SW.
IC803	SVIM5238FP	001 061 5284 5	I.C., OPERATION AMP.
IC804	SVINJM5532M	001 061 4775 5	I.C., OPERATION AMP.
IC806	MN1280-S	001 061 3084 9	I.C., MUTING
IC809, IC810	SVIGA011	001 061 3045 6	I.C., FILTER
TRANSISTORS			
Q11	2SD1862QR	001 030 7210 8	TRANSISTOR
Q12, Q13	2SB1240QR	001 030 7208 2	TRANSISTOR
Q14	2SB1240QR	001 030 7208 2	TRANSISTOR
Q15	2SD1862QR	001 030 7210 8	TRANSISTOR
Q16	2SB1240QR	001 030 7208 2	TRANSISTOR
Q17	2SA154QR	001 030 7422 8	TRANSISTOR
Q101	2SC4010Q	001 030 7233 1	TRANSISTOR
Q141	2SD1862QR	001 030 7210 8	TRANSISTOR
Q142	2SB1240QR	001 030 7208 2	TRANSISTOR
Q161	2SD1862QR	001 030 7210 8	TRANSISTOR
Q162	2SB1240QR	001 030 7208 2	TRANSISTOR
Q181	2SD1862QR	001 030 7210 8	TRANSISTOR
Q182	2SB1240QR	001 030 7208 2	TRANSISTOR
Q402	2SD1862QR	001 030 7210 8	TRANSISTOR
Q403	2SB1240QR	001 030 7208 2	TRANSISTOR
Q405, Q406	UN4212	001 030 3019 1	TRANSISTOR
Q408	UN4119	001 030 7216 2	TRANSISTOR
Q409, Q801	UN4212	001 030 3019 1	TRANSISTOR
Q802	UN4113	001 030 2900 9	TRANSISTOR
Q803, Q804	2SC3311A-Q	001 030 5279 5	TRANSISTOR
Q805	2SC3311A-Q	001 030 5279 5	TRANSISTOR
Q809	UN4112	001 030 3018 2	TRANSISTOR
Q810	UN4212	001 030 3019 1	TRANSISTOR
DIODES			
D11, D12	MA4091-M	001 032 7213 5	DIODE
D15, D16	MA4068H	001 032 4952 9	DIODE
D17	MA4330M	001 032 4967 2	DIODE
D18	MA4062-M	001 032 7211 7	DIODE
D19- D26 ⚠	SVD1SR35200A	001 032 3951 4	RECTIFIER
D181, D182	MA165	001 032 0494 0	DIODE
D401- D406	MA165	001 032 0494 0	DIODE
D412, D413	MA165	001 032 0494 0	DIODE
D415- D418	MA165	001 032 0494 0	DIODE
D421, D422	MA165	001 032 0494 0	DIODE
D424	MA4091-M	001 032 7213 5	DIODE
D501	MA153	001 032 0489 7	DIODE
D801, D802	MA165	001 032 0494 0	DIODE
I.C.PROTECTORS			
FP11 (EK, XA, XB) (PA, PE, PC)	SRUDPF06F6	016 712 0339 4	I.C.PROTECTOR
FP12 (EK, XA, XB) (PA, PE, PC)	SRUDPT08F6	016 712 0338 5	I.C.PROTECTOR
HALL ELEMENTS			
H501, H502	0H-001	001 036 0010 2	HALL ELEMENT
VARIABLE RESISTORS			
VR101	EVND3AA00B53	001 180 2644 9	V.R., 5KΩ(B)
VR102, VR103	EVND3AA00B14	001 180 2642 1	V.R., 10KΩ(B)
VR104, VR105	EVND3AA00B14	001 180 2642 1	V.R., 10KΩ(B)
VR106	EVND3AA00B53	001 180 2644 9	V.R., 5KΩ(B)
VR301	EVN38CA00B13	001 180 0549 5	V.R., 1KΩ(B)
COILS AND TRANSFORMERS			
L1, L2 ⚠	SLQX400-D	001 210 7020 0	COIL
L301, L302	ELEV101KA	001 211 0608 1	COIL
L401	ELEV101KA	001 211 0608 1	COIL
L501	NL4532T100K2	001 211 3218 9	COIL
L801, L802	ELEV3R3KA	001 211 4255 0	COIL
T1 ⚠ (E, EG, EB, EH) (EF, EI)	SLTD5K028SE	001 202 8859 3	POWER TRANSFORMER
T1 ⚠ (EK, XL)	SLTD5K029SG	001 202 8860 0	POWER TRANSFORMER
T1 ⚠ (XA, XB, PA) (PE, PC)	SLTD5K030SX	001 202 8861 9	POWER TRANSFORMER
OSCILLATORS			
X301	SVQ16CKSS	001 250 1471 7	16.9344MHZ
DISPLAYS			
FL401	SADD3-1	001 001 0473 8	DISPLAY
FUSES			
F1 ⚠ (E, EK, XL, EG) (EB, EH, EF) (EI)	XBA2C012TB0	002 380 1370 8	250V, T125mA
F1 ⚠ (XA, XB, PA) (PE, PC)	XBA2C025TB0	002 380 1458 1	250V, T250mA
F2 ⚠ (E, EG, EB, EH) (EF, EI)	XBA2C08TB0	002 380 1460 7	250V, T800mA
SWITCHES			
S1 ⚠	ESB8249V	003 435 5877 0	POWER SW
S2 ⚠ (XA, XB, PA) (PE, PC)	SSR187-1	003 430 2201 5	SW, VOLTAGE SELECT
S401- S410	SSGD5	003 437 0982 0	SW, OPERATION
RELAYS			
RL801	SSYD2	003 450 2734 9	RELAY

Ref. No.	Part No.	Part Code	Description
CABINET AND CHASSIS			
50	SHGD95-1	016 653 1136 7	RUBBER CUSHION
51	SKCD570KY0A	016 800 3041 6	CABINET
52	SUBD7	016 712 0353 6	ROD
53	SBC666-1	016 702 6076 0	BUTTON
54	SBCD430ZK0A	016 702 6938 9	BUTTON
55	SBCD440ZK0B	016 702 6962 9	BUTTON
57	SUWD68	016 650 5414 3	BRACKET
58	SHRD73	016 652 0765 3	HOLDER
59	SGYLPJ22-KE	016 840 7685 6	FRONT PANEL
60	SGXD3010ZK0B	016 846 3819 6	ORNAMENT
61 (XL)	SGPD650ZF11A	016 840 7980 2	CHASSIS
61 (XB)	SGPD650ZF14A	016 840 7979 5	CHASSIS
61 (E)	SGPD650ZF3A	016 840 7739 9	CHASSIS
61 (XA)	SGPD650ZF5A	016 840 7923 1	CHASSIS
61 (EK)	SGPD650ZF7A	016 840 7738 0	CHASSIS
61 (EB, EH, EF) (EI)	SGPLPJ22-KEB	016 840 7701 3	CHASSIS
61 (EG)	SGPLPJ22-KEG	016 840 7702 2	CHASSIS
61 (PA, PE, PC)	SGPLPJ22-KPA	016 840 7700 4	CHASSIS
63	SKL307	016 828 0325 7	FOOT
64 ⚠ (E, EG, EB, EH) (EF, EI, XA) (PA, PE, PC)	SJS9225	003 400 3946 5	AC OUTLET
64 ⚠ (EK)	SJS9227	003 400 3948 3	AC OUTLET
65	SUSD65	016 726 0903 2	SPRING (YELLOW)
66	SUSD42	016 726 0841 9	SPRING (SILVER)
67	SUSD66	016 726 0904 1	SPRING (BLUE)
68 ⚠ (XL)	SJSD16	003 400 7436 6	AC SOCKET
68 ⚠ (E, EK, EG, EB) (EH, EF, EI) (XA, XB, PA) (PE, PC)	SJS9236	003 403 4660 7	AC SOCKET
69	SMND7-1	016 631 0050 8	HOLDER
70	SJFD4	003 410 7707 6	OUTPUT TERMINAL
71	SJJ130-2	003 400 7317 2	JACK, REMOTE
72	SJJ130-3	003 400 7580 9	JACK, SYNCHRO
73	EMCS0650Z	003 402 1235 7	CONNECTOR (CN11)
74	EMCS0750Z	003 402 1238 4	CONNECTOR (CN401)
75	EMCS0552M	003 402 0112 1	CONNECTOR (CN102)
76	SJSD1709	003 403 6503 1	CONNECTOR (CN101)
77	SRDJ001N14E	003 410 6157 8	SHORTING PIN (CN102)
79	EMCS0350Z	003 402 1227 7	CONNECTOR (CN103)
82	EMCS0550Z	003 402 1233 9	CONNECTOR (CN402)
SCREWS, WASHERS & NUTS			
N1	SNSD10	005 500 5675 8	SCREW
N2	XTN2+4G	005 501 2780 5	SCREW
N3	XQN17+A6	005 500 4900 2	SCREW
N4	SHDD1-5	016 652 0759 1	SCREW
N5	XTW3+8T	005 501 1358 9	SCREW
N6	XXE26D5	005 500 5095 2	SCREW
N7	SNSD9	016 726 0765 4	SCREW
N8	XSN26+6	005 500 1364 6	SCREW
N9	SFXW120-01	005 513 0957 0	WASHER
N10	XSN26+8	005 500 1368 2	SCREW
N11	XTN2+5G	005 501 3534 3	SCREW
N12	SNE2129-1	005 500 7938 6	SCREW
N13	XTV3+6JFYR	005 501 2611 1	SCREW
N14	XTV3+8G	005 501 0913 8	SCREW
N15	SFXGQ06N01	005 500 4983 3	SCREW
N16	XTV3+8JFZ	005 501 0919 2	SCREW
N18	XTV3+14G	005 501 0851 5	SCREW
N19	XTV3+6BFN	005 501 0888 2	SCREW
N20	XTV3+6GFZ	005 501 3160 3	SCREW

Ref. No.	Part No.	Part Code	Description
LOADING MECHANICAL			
1	SIRLX880-KN	016 652 0774 2	DISC TRAY ASS'Y
1-1	SHGD49	016 653 1079 9	RUBBER CUSHION
4	SGXD3020ZK0A	016 846 3724 2	ORNAMENT PLATE
5	SUSD29-1	016 726 0845 5	SPRING
6	SIRD20	016 718 3355 2	LEVER
7	SIRD16E	016 631 0042 8	HOLDER ASS'Y
7-1	SHGD46	016 653 1080 6	RUBBER CUSHION
9	SUWD46	016 650 5256 9	BRACKET
10	SUXD25	016 634 0124 2	SHAFT
11 ⚠	SOALP1200-KM	001 271 0692 3	OPTICAL PICKUP ASS'Y
12	EWSL04A00000	016 631 0044 6	HOLDER
13	SHGD131	016 653 1216 8	STOPPER
14	SORD10E	001 211 3219 8	COIL
15	EWS7B0A00Q53	001 174 8773 3	RESISTANCE UNIT
16	SOYD8E	016 634 0128 8	YOKE
17	SOYD9	016 634 0125 1	YOKE
18	SJGD8E	002 310 2569 3	MOTOR
19	SHGD116	016 653 1188 5	RUBBER CUSHION
21	SDRD2	016 740 0117 8	ROLLER
22	SUWD44	016 650 5250 5	BRACKET
23	SHGD69	016 653 1078 0	RUBBER
24	SOYD2	016 634 0111 7	YOKE
25	SOMD4	003 453 0241 8	MAGNET
26	SIRD17E	016 645 0165 2	CLAMPER
27	SIRD28	016 631 0053 5	HOLDER
28	SDGD19	016 745 0199 5	GEAR
29	SDGD20-1	016 745 0202 7	GEAR
31	SDOD8	005 512 0399 3	RING
32	SRQA010N04	017 726 0412 8	SPRING
33	SDOD7-1	016 766 0190 7	TURNTABLE ASS'Y
34	SISD7E	016 827 0313 6	BASE
39	SMBD2-1	016 754 0059 5	BELT
40	SHRD23	016 652 0633 4	LOCK SHAFT
41	SOMD9A	016 743 0060 3	ROTOR
42	SXPD1440	003 483 3040 5	SPINDLE P.C.B.
43	SHRD19	016 652 0634 3	LEVER
44	SUSD31	016 726 0843 7	SPRING
45	SUSD51	016 726 0846 4	SPRING

Ref. No.	Part No.	Part Code	Description
PACKINGS			
P1 (E, EK, XL, EG) (EB, EH, EI) (XA, XB, PA) (PE, PC)	SPND185	016 971 5050 3	CARTON BOX
P1 (EF)	SPND186	016 971 5122 4	CARTON BOX
P2	SPSD120	016 977 3346 8	PAD
P3	SPSD121	016 977 3345 9	PAD
P4	XZB50X50A01	016 978 0524 5	PROTECTION COVER
P5	SPSD68	016 977 3081 4	SHEET
P6	XZB23X20C03	016 978 0480 0	POLYETHYLENE BAG
P7	SPSD101	016 977 3232 7	SHEET
ACCESSORIES			
A1 (XL, XA)	SQUD176	016 983 5178 2	INSTRUCTION MANUAL
A1 (EK)	SQUD177	016 983 5176 4	INSTRUCTION MANUAL
A1 (EI)	SQUD178	016 983 5319 7	INSTRUCTION MANUAL
A1 (EG)	SQUD232	016 983 5288 7	INSTRUCTION MANUAL
A1 (EF)	SQUD233	016 983 5318 8	INSTRUCTION MANUAL
A1 (E, EB, EH)	SQULPJ22-KE	016 983 5191 5	INSTRUCTION MANUAL
A1 (PA, PE, PC)	SQULPJ22-KPA	016 983 5317 9	INSTRUCTION MANUAL
A1 (XB)	SQULPJ22-KXB	016 983 5316 0	INSTRUCTION MANUAL
A2 ⚠ (E, EG, EB, EH) (EF, EI)	SFDAC05E03	003 490 4809 5	POWER CORD
A2 ⚠ (XA, PA, PE) (PC)	SJA168-1	003 490 4122 9	POWER CORD
A2 ⚠ (XL)	SJA173	003 490 4161 2	POWER CORD
A2 ⚠ (XB)	SJA183	003 490 4873 7	POWER CORD
A2 ⚠ (EK)	SJA188	003 490 5443 1	POWER CORD
A3	SJP2249-1	003 492 6446 4	OUTPUT CORD
A4 ⚠ (XA, XB, PA) (PE, PC)	SJP9215	003 402 1437 9	AC PLUG ADAPTOR
A5	SJP2257	003 492 4915 4	CORD, SYNCHRO-REC

■ RESISTORS AND CAPACITORS

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value

ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value 47×10^{1} (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	330
Type	Voltage	Peculiarity	Value (33×10^{0} microfarad)

Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERX : Metal Film ERQ : Fuse Type Metal ERD□ L : Carbon (chip) ERO□ K : Metal Film (chip) ERC : Solid	10 : 1/8W 12 : 1/2W 25 : 1/4W 1A : 1W 18 : 1/8W S2 : 1/4W S1 : 1/2W 2F : 1/4W 50 : 1/2W 2A : 2W	J : ±5% F : ±1% G : ±2% K : ±10%

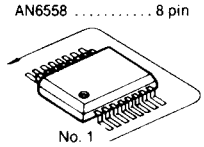
Capacitor Type	Voltage	Tolerance
ECE : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECQP : Polyproylene ECG : Ceramic ECEA□□□N: Non Polar Electrolytic QCU□ : Ceramic (Chip Type) ECUX : Ceramic (Chip Type) ECF : Semiconductor EECW : Liquid electrolyte double layer capcitor	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1H : 50V 1V : 35V 50 : 50V 05 : 50V 2H : 500V 2A : 100V 1 : 100V KC : 400V AC KC : 125VAC (UL) 1J : 63V	C : ±0.25pF J : ±5% K : ±10% Z : +80% −20% P : +100% −0% M : ±20% D : ±0.5pF G : ±2%

Ref. No.	Part No.	Part Code
RESISTORS		
R11, R12	ERDS2TJ681	001 152 2449 8
R13	ERDS2TJ221	001 152 2431 8
R14	ERDS2TJ101	001 152 2421 0
R15, R16	ERDS2TJ561	001 152 2364 2
R17	ERDS2TJ222	001 152 2353 5
R18	ERDS2TJ392	001 152 2439 0
R19	ERDS2TJ103	001 152 2347 3
R20	ERDS2TJ332	001 152 2357 1
R21	ERDS2TJ153	001 152 2351 7
R22, R23	ERDS2TJ682	001 152 2365 1
R24, R25	ERDS2TJ471	001 152 2361 5
R26	ERDS2TJ471	001 152 2361 5
R27	ERDS2TJ392	001 152 2439 0
R30	ERDS1FJ330	001 152 2604 5
R101	ERDS2TJ154	001 152 2427 4
R102, R103	ERDS2TJ472	001 152 2362 4
R104	ERDS2TJ223	001 152 2432 7
R105	ERDS2TJ334	001 152 2438 1
R107	ERDS2TJ683	001 152 2450 5
R108	ERDS2TJ332	001 152 2357 1
R109	ERDS2TJ822	001 152 2455 0
R110, R111	ERDS2TJ682	001 152 2365 1
R112	ERDS2TJ822	001 152 2455 0
R113, R114	ERDS2TJ182	001 152 2352 6
R115	ERDS2TJ102	001 152 2346 4
R116, R117	ERDS2TJ182	001 152 2352 6
R118	ERDS2TJ102	001 152 2346 4
R119	ERDS2TJ471	001 152 2361 5
R120	ERDS2TJ120	001 152 3146 6
R122	ERDS2TJ471	001 152 2361 5
R141	ERDS2TJ102	001 152 2346 4
R142	ERDS2TJ333	001 152 2358 0
R143	ERDS2TJ224	001 152 2433 6
R144	ERDS2TJ333	001 152 2358 0
R145	ERDS2TJ153	001 152 2351 7
R146	ERDS2TJ122	001 152 2423 8
R147	ERDS2TJ682	001 152 2365 1
R148	ERDS2TJ104	001 152 2348 2
R149	ERDS2TJ152	001 152 2350 8
R150	ERDS2TJ103	001 152 2347 3
R151	ERDS2TJ101	001 152 2421 0
R152	ERDS2TJ153	001 152 2351 7
R153	ERDS2TJ270	001 152 2434 5
R154	ERDS2TJ3R3	001 152 3152 8
R161	ERDS2TJ333	001 152 2358 0
R162	ERDS2TJ222	001 152 2353 5
R163	ERDS2TJ333	001 152 2358 0
R164	ERDS2TJ153	001 152 2351 7
R165	ERDS2TJ122	001 152 2423 8
R166	ERDS2TJ102	001 152 2346 4
R167	ERDS2TJ681	001 152 2449 8
R168	ERDS2TJ272	001 152 2354 4
R169	ERDS2TJ392	001 152 2439 0
R170	ERDS2TJ101	001 152 2421 0
R171	ERDS2TJ270	001 152 2434 5
R172	ERDS2TJ3R3	001 152 3152 8
R180	ERDS2TJ474	001 152 2443 4
R181	ERDS2TJ471	001 152 2361 5
R182, R183	ERDS2TJ564	001 152 2447 0
R184	ERDS2TJ223	001 152 2432 7
R185	ERDS2TJ433	001 152 2575 3
R186, R187	ER0S2TKF4702	001 151 5723 2
R188	ER0S2TKF4702	001 151 5723 2
R189, R190	ERDS2TJ123	001 152 2424 7
R191	ERDS2TJ154	001 152 2427 4
R192	ERDS2TJ824	001 152 2457 8
R193	ERDS2TJ101	001 152 2421 0
R194	ERDS2TJ683	001 152 2450 5
R195, R196	ERDS2TJ103	001 152 2347 3
R197	ERDS2TJ473	001 152 2363 3
R198	ERDS2TJ393	001 152 2440 7
R301	ERDS2TJ102	001 152 2346 4
R302	ERDS2TJ472	001 152 2362 4
R305	ERDS2TJ104	001 152 2348 2
R307	ERDS2TJ471	001 152 2361 5
R308	ERDS2TJ121	001 152 2349 1
R309	ERDS2TJ472	001 152 2362 4
R401, R402	ERDS2TJ223	001 152 2432 7
R403	ERDS2TJ472	001 152 2362 4
R404, R406	ERDS2TJ394	001 152 2441 6
R407	ERDS2TJ152	001 152 2350 8
R409, R410	ERDS2TJ472	001 152 2362 4
R411, R412	ERDS2TJ472	001 152 2362 4
R413, R414	ERDS2TJ472	001 152 2362 4
R415	ERDS2TJ472	001 152 2362 4
R416	ERDS2TJ913	001 152 3708 4
R417	ERDS2TJ124	001 152 2425 6
R418	ERDS2TJ913	001 152 3708 4
R419	ERDS2TJ124	001 152 2425 6
R420	ERDS2TJ101	001 152 2421 0
R423	ERDS2TJ103	001 152 2347 3
R424	ERDS2TJ473	001 152 2363 3
R425, R426	ERDS2TJ103	001 152 2347 3
R427, R428	ERDS2TJ103	001 152 2347 3
R429, R430	ERDS2TJ222	001 152 2353 5
R431, R432	ERDS2TJ222	001 152 2353 5
R434	ERDS2TJ472	001 152 2362 4
R501, R502	ERJ8GEYK1R5	001 151 6260 8
R503	ERJ8GEYJ223	001 151 5630 6
R801, R802	ERDS2TJ222	001 152 2353 5
R803, R804	ERDS2TJ272	001 152 2354 4
R805, R806	ERDS2TJ221	001 152 2431 8
R807, R808	ERDS2TJ391	001 152 2360 6
R809, R810	ERDS2TJ473	001 152 2363 3
R821, R822	ERDS2TJ472	001 152 2362 4
R823	ERDS2TJ104	001 152 2348 2
R825, R826	ERDS2TJ102	001 152 2346 4
R827	ERDS2TJ103	001 152 2347 3
R828, R829	ERDS2TJ102	001 152 2346 4
R843	ERDS2TJ473	001 152 2363 3
CAPACITORS		
C1 ⚠	ECKDKC103PF2	001 103 3734 7
C2 ⚠	RXAF103Z22EY	001 230 0547 0
C11, C12	ECFD1H104ZF	001 108 0906 2
C13	ECEA1CU470	001 120 2835 0
C14	ECFD1H104ZF	001 108 0906 2
C15, C16	ECEA1CU221	001 120 2833 2
C17, C18	ECFD1H104ZF	001 108 0906 2
C19, C20	REC1A101M0T	001 120 5628 3
C21, C22	ECEA1CU222	001 120 3074 3
C23, C24	ECEA1CU331	001 120 3200 5
C25, C26	ECEA1VU101	001 120 2929 5
C27, C28	ECEA0JS331	001 120 2975 9
C29	REC1A101M0T	001 120 5628 3
C30	ECFD1H104ZF	001 108 0906 2
C31	RCBS1C103MYY	001 103 8060 6

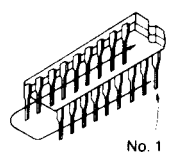
Ref. No.	Part No.	Part Code
C32	ECFF1H103KR	001 108 1049 4
C101	ECFD1H104ZF	001 108 0906 2
C102, C103	ECKD1H102KB	001 103 1414 8
C104	ECKD1H681K	001 103 1580 5
C105, C106	ECKD1H471KB	001 103 1551 0
C107	ECCD1H220K	001 103 0493 7
C108	ECEA1HS0R1	001 120 3250 5
C109	ECEA1HU010	001 120 2842 1
C110	ECQV1H104JZ	001 106 2571 7
C111, C112	ECEA1HU100	001 120 3251 4
C113	ECEA1HKNR33	001 120 3230 9
C114	RCBS1C182MXY	001 103 8660 8
C115	RCBS1C682MXY	001 103 7092 2
C116	ECQM1H333JZ	001 106 0779 1
C117	ECKD1H221KB	001 103 1487 1
C118	ECEA1HU010	001 120 2842 1
C119	ECEA0JU220	001 120 4670 5
C120	ECKD1H681K	001 103 1580 5
C121	ECFF1H103KR	001 108 1049 4
C122, C123	ECCD1H101KB	001 103 5369 0
C124	ECKD1H222KB	001 103 1494 2
C125	ECEA0JU220	001 120 4670 5
C126	ECEA0JU470	001 120 3125 9
C127, C128	ECKD1H102KB	001 103 1414 8
C129	ECKD1H681K	001 103 1580 5
C141	ECQM1H153JZ	001 106 0704 0
C142	ECQM1H122JZ	001 106 0683 8
C143	ECQM1H473JZ	001 106 0810 9
C144	ECEA1VSN2R2	001 120 5070 9
C145	ECEA1HSNR22	001 120 4836 1
C161	ECQM1H153JZ	001 106 0704 0
C162	RCBS1H681KBY	001 103 5642 2
C163	ECQM1H103JZ	001 106 0667 8
C164	ECEA1ESN3R3	001 120 5060 1
C165	ECEA1HSN0R1	001 120 4837 0
C181	ECQM1H474JZ	001 106 2709 7
C182	RCBS1H221KBY	001 103 5603 9
C183	ECQM1H682JZ	001 106 0832 3
C184	ECEA1HSN010	001 120 3237 2
C186	ECQM1H224JZ	001 106 0746 0
C187	ECEA1VSN2R2	001 120 5070 9
C189	RCBS1H101KBY	001 103 5569 4
C190	ECKD1H101KB	001 103 1412 0
C301	ECCD1H220K	001 103 0493 7
C302	ECCD1H070CC	001 103 0271 9
C303	ECEA1VSN2R2	001 120 5070 9
C304, C305	ECFD1H104ZF	001 108 0906 2
C306	ECFF1H103KR	001 108 1049 4
C307	ECKD1H471KB	001 103 1551 0
C308	ECFD1H104ZF	001 108 0906 2
C309	ECCD1H070CC	001 103 0271 9
C310	ECFF1H103KR	001 108 1049 4
C311, C401	ECFD1H104ZF	001 108 0906 2
C402	ECEA0JU470	001 120 3125 9
C403	ECFF1H103KR	001 108 1049 4
C404, C405	ECFD1H104ZF	001 108 0906 2
C406	ECCD1H220K	001 103 0493 7
C408, C409	ECFF1H103KR	001 108 1049 4
C414, C416	ECFF1H103KR	001 108 1049 4
C417	ECFD1H104ZF	001 108 0906 2
C418, C419	ECCD1H101KB	001 103 5369 0
C420	ECEA0JU101	001 120 2829 8
C421, C422	ECKD1H101KB	001 103 1412 0
C423	ECKD1H101KB	001 103 1412 0
C501	ECEV1EV330	001 120 5624 7
C502	ECEV1HV010	001 120 5625 6
C504	GR426B273K50	001 103 9113 6
C506	GR426B152K25	001 103 9112 7
C507	GR426B104Z25	001 103 9270 4
C511, C512	ECEA1EN470S	001 120 2394 4
C513	ECEA1EN470S	001 120 2394 4
C801, C802	ECCD1H181KB	001 103 0467 9
C803, C804	RBP1CN220CT	001 120 5015 6
C805, C806	ECKD1H102KB	001 103 1414 8
C813, C816	ECFD1H104ZF	001 108 0906 2
C818	ECEA1VSN2R2	001 120 5070 9

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

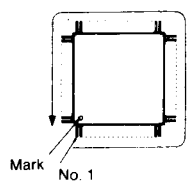
AN8370S ..... 42 pin
AN6554NS ..... 14 pin
MN6636S ..... 10 pin
AN8290S ..... 24 pin
MN1550PDT ..... 18 pin
SVICXK5816M .... 24 pin
SVIUPD4053 ..... 14 pin
SVINJM5532 ..... 8 pin
SVIM5238 ..... 8 pin
SVIM5218P ..... 8 pin
AN6558 ..... 8 pin



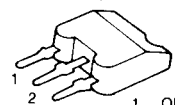
SVIPCM54HP-1 ... 28 pin
MN1526PDW .... 64 pin



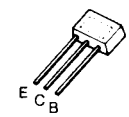
MN6617S ..... 84 pin
MN6618A ..... 42 pin



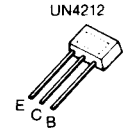
MN1280-R, MN1280S



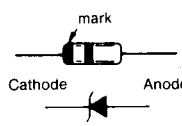
2SC3311
2SD1450



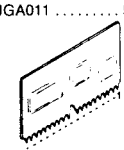
UN4112
UN4113
UN4212



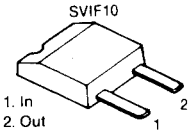
MA4068, MA4056,
MA4330, MA4091

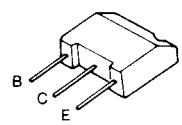


EHDGA1243 ..... 15 pin
SVIGA011 ..... 5 pin



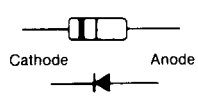
SVIFU15
SVIF38
SVIF10



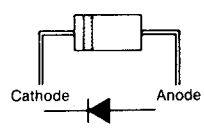


2SC4010
2SB1240
2SD1862

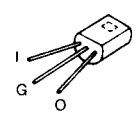
MA165



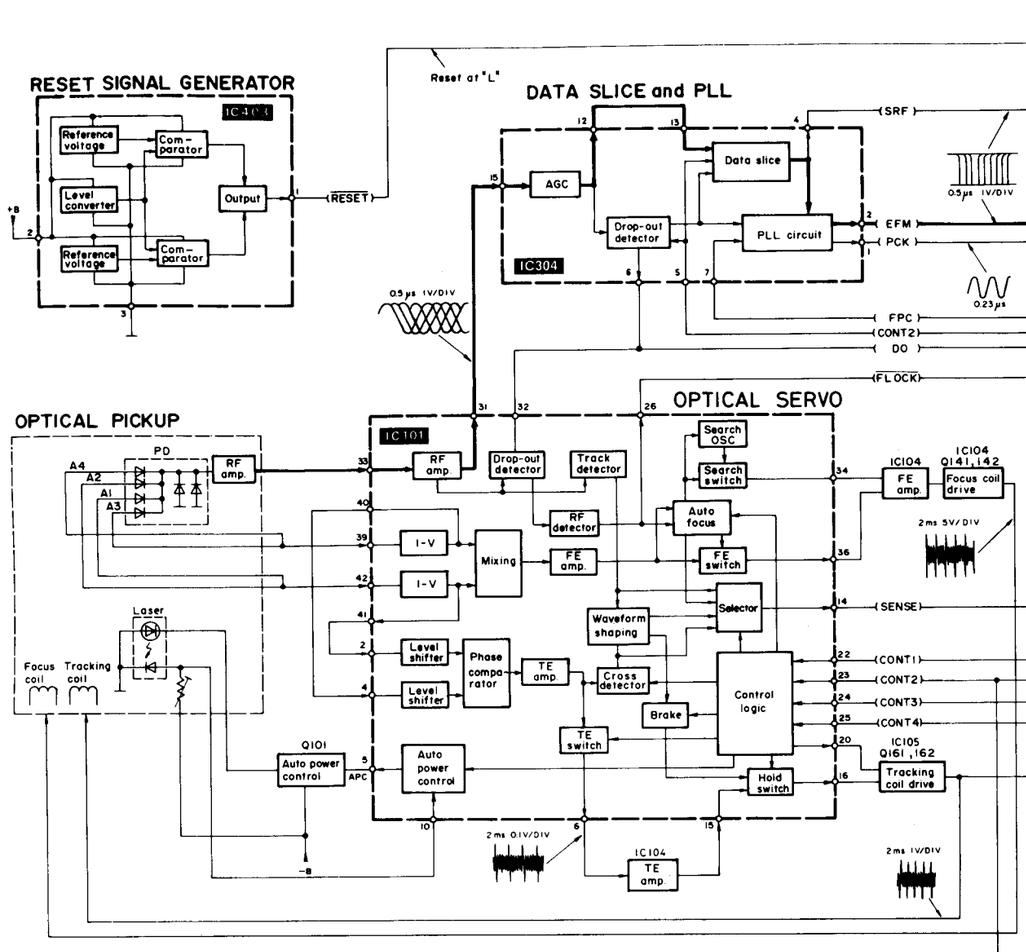
SVISR35200A

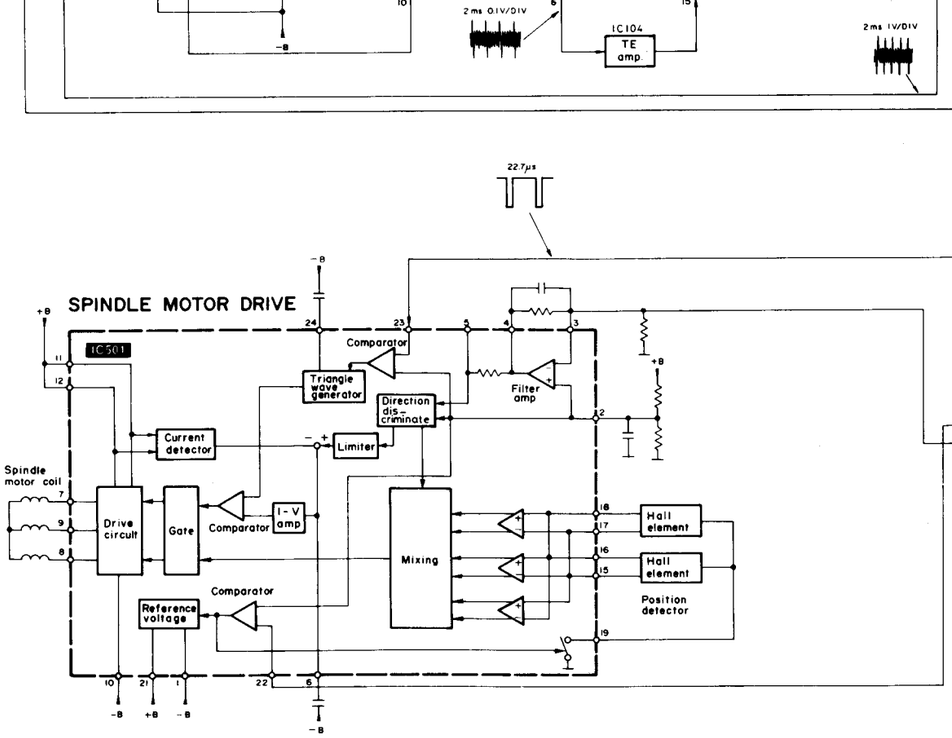


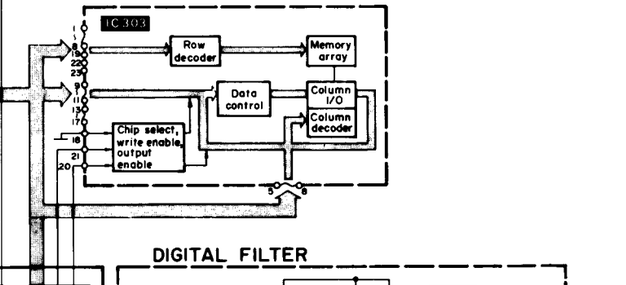
SVIM5236L

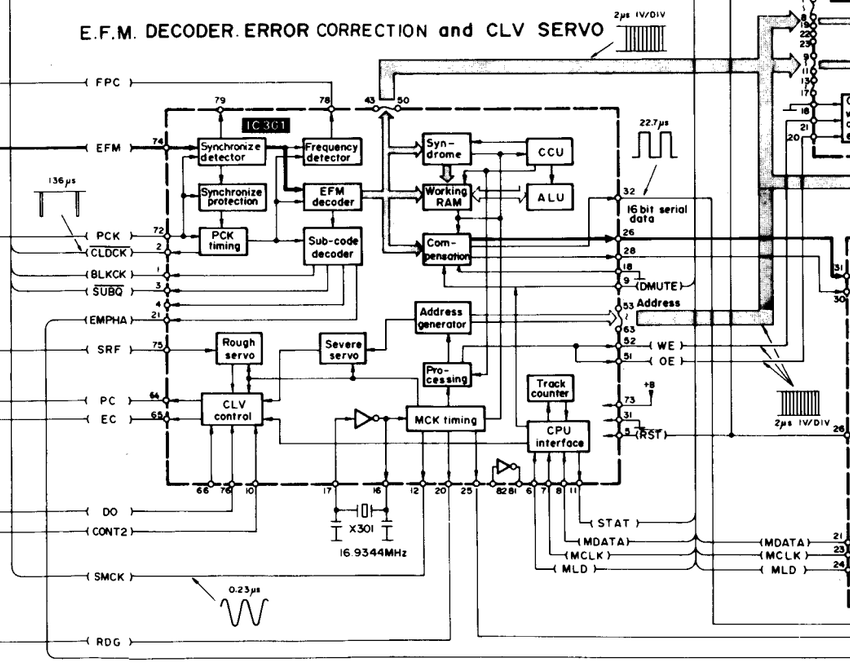


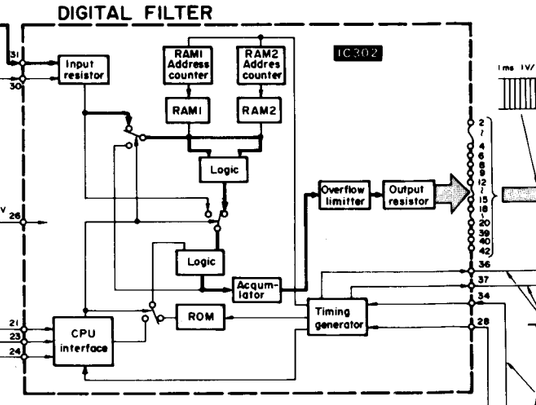
■ BLOCK DIAGRAM

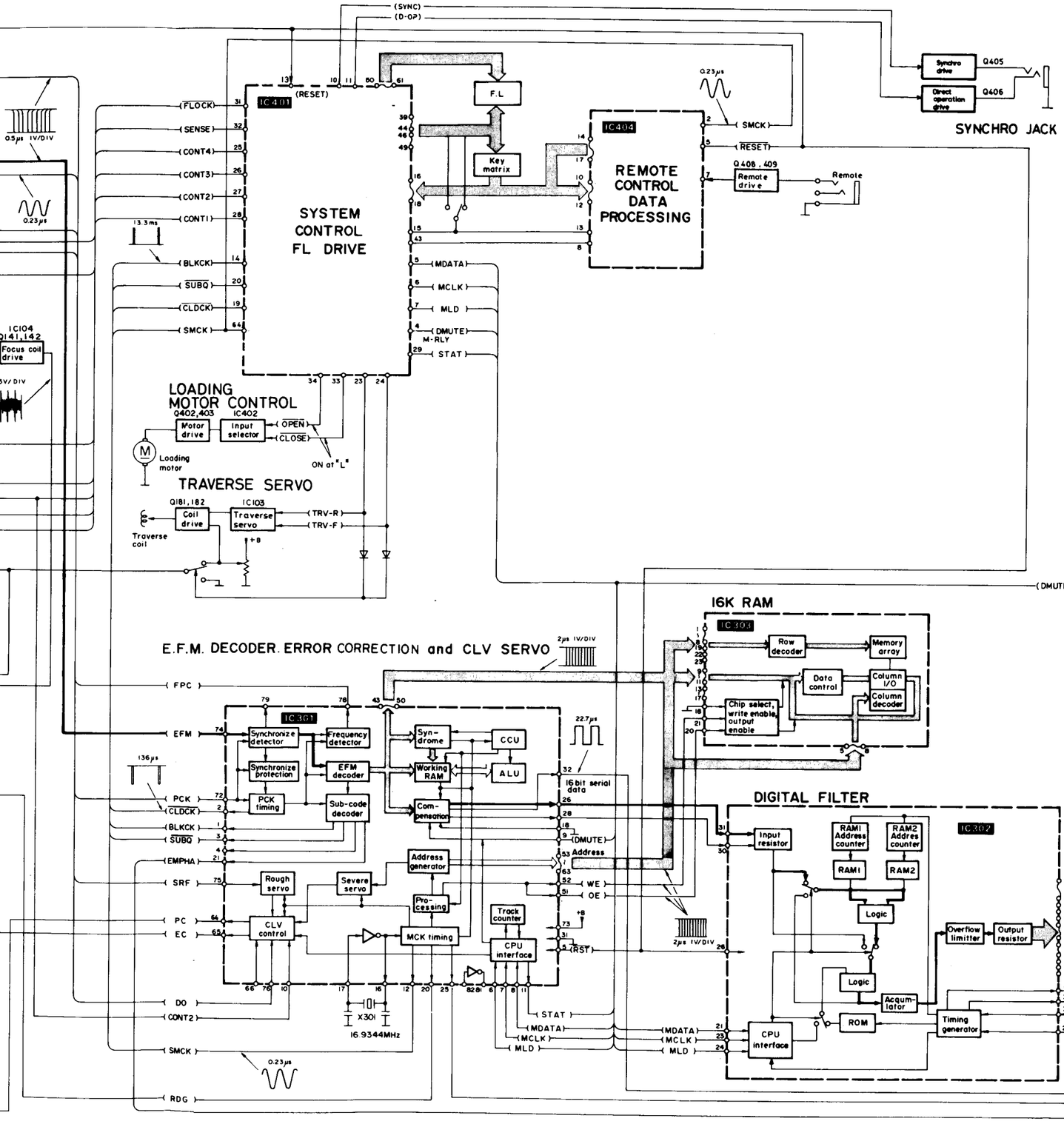


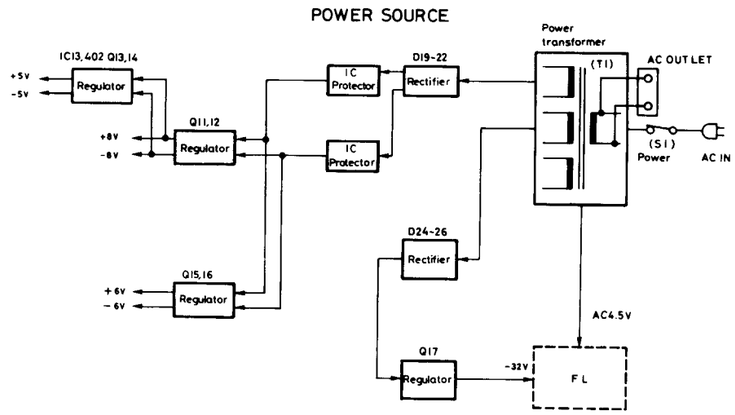








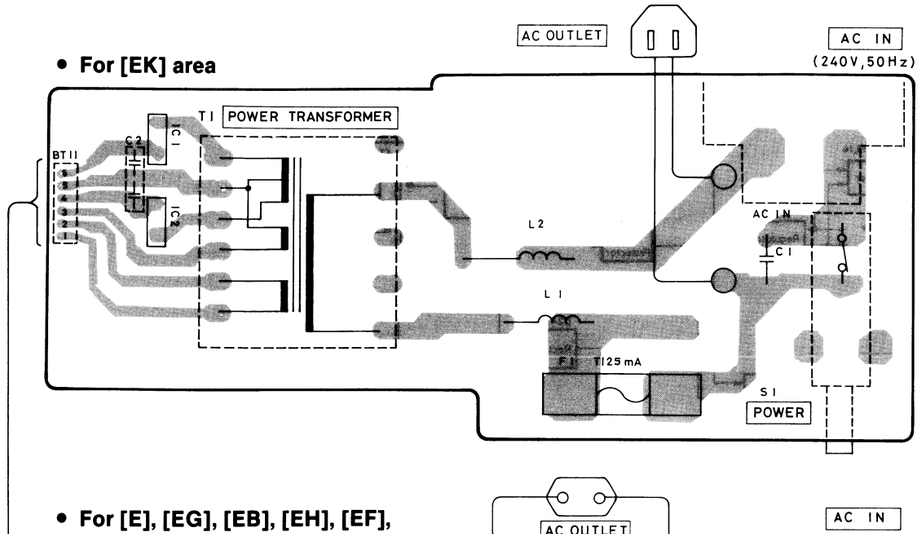

(SYNC)
(D-OP)
IC401
(RESET)
SYSTEM CONTROL FL DRIVE
(FLOCK)
(SENSE)
(CONT4)
(CONT3)
(CONT2)
(CONT1)
13.3ms
(BLKCK)
(SUBQ)
(CLDCK)
(SMCK)
F.L
Key matrix
IC404
REMOTE CONTROL DATA PROCESSING
0.23µs
(SMCK)
(RESET)
Q408, 409
Remote drive
Remote
Synchro drive
Direct operation drive
Q405
Q406
SYNCHRO JACK
(MDATA)
(MCLK)
(MLD)
(DMUTE)
M-RLY
(STAT)
LOADING MOTOR CONTROL
Q402,403
Motor drive
IC402
Input selector
(OPEN)
(CLOSE)
Loading motor
ON at "L"
TRAVERSE SERVO
Q181,182
Coil drive
IC103
Traverse servo
(TRV-R)
(TRV-F)
Traverse coil
+8
IC104
Q141,142
Focus coil drive
E.F.M. DECODER. ERROR CORRECTION and CLV SERVO
2µs 1V/DIV
(FPC)
(EFM)
(PCK)
(CLDCK)
(BLKCK)
(SUBQ)
(EMPHA)
(SRF)
(PC)
(EC)
(DO)
(CONT2)
(SMCK)
(RDG)
IC301
Synchronize detector
Frequency detector
Synchronize protection
EFM decoder
PCK timing
Sub-code decoder
Rough servo
Severe servo
CLV control
Syn-drome
CCU
Working RAM
ALU
Com-pensation
Address generator
Pro-cessing
MCK timing
Track counter
CPU interface
22.7µs
16 bit serial data
Address
(WE)
(OE)
(RST)
136µs
X301
16.9344MHz
0.23µs
16K RAM
IC303
Row decoder
Memory array
Data control
Column I/O
Column decoder
Chip select, write enable, output enable
DIGITAL FILTER
IC302
Input resistor
RAM1 Address counter
RAM2 Addres counter
RAM1
RAM2
Logic
Logic
Acqum-lator
ROM
CPU interface
Overflow limitter
Output resistor
Timing generator
11.35µs
16.9344MHz
1ms 1V/DIV
D/A CONVERTER
IC801
Ladder resistor network
I-V
IC806, Q801, 802, 803
Muting drive
Relay
RL801
Deglitch
IC802
Sample hold
IC803
Low-pass filter
IC809
S W
Q804
Deglitch
IC802
Sample hold
IC803
Low-pass filter
IC810
S W
Q805
Q809,810
Emphasis drive
Lch
Rch


POWER SOURCE
Power transformer
(T1)
AC OUTLET
IC13, 402 Q13, 14
Regulator
+5V
-5V
Q11,12
Regulator
+8V
-8V
IC Protector
IC Protector
D19-22
Rectifier
(S1)
Power
AC IN
D24-26
Rectifier
Q15,16
Regulator
+6V
-6V
AC4.5V
Q17
Regulator
-32V
F L

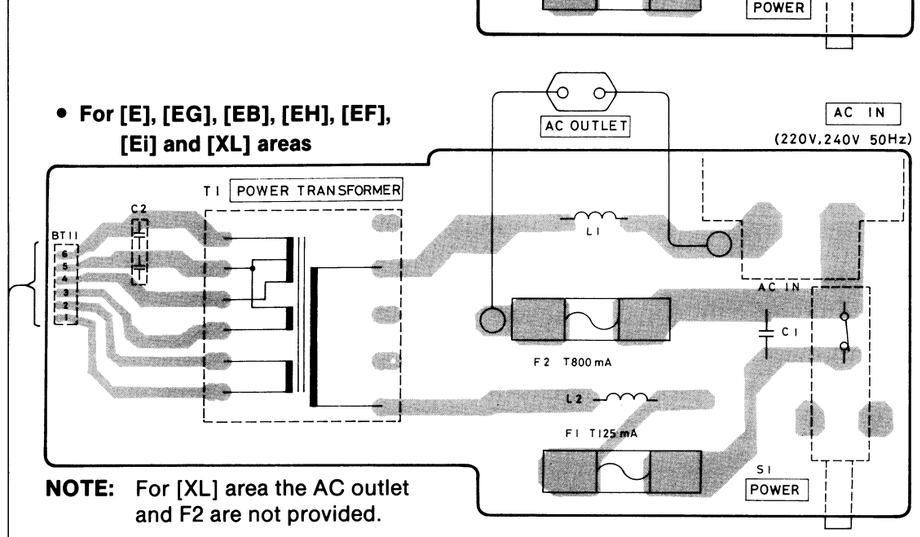
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

• POWER SOURCE P.C.B.

• For [EK] area

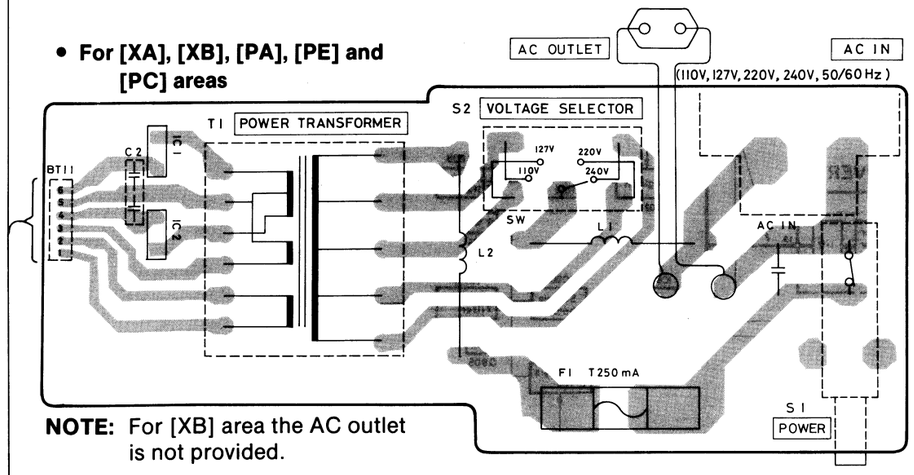


• For [E], [EG], [EB], [EH], [EF], [Ei] and [XL] areas



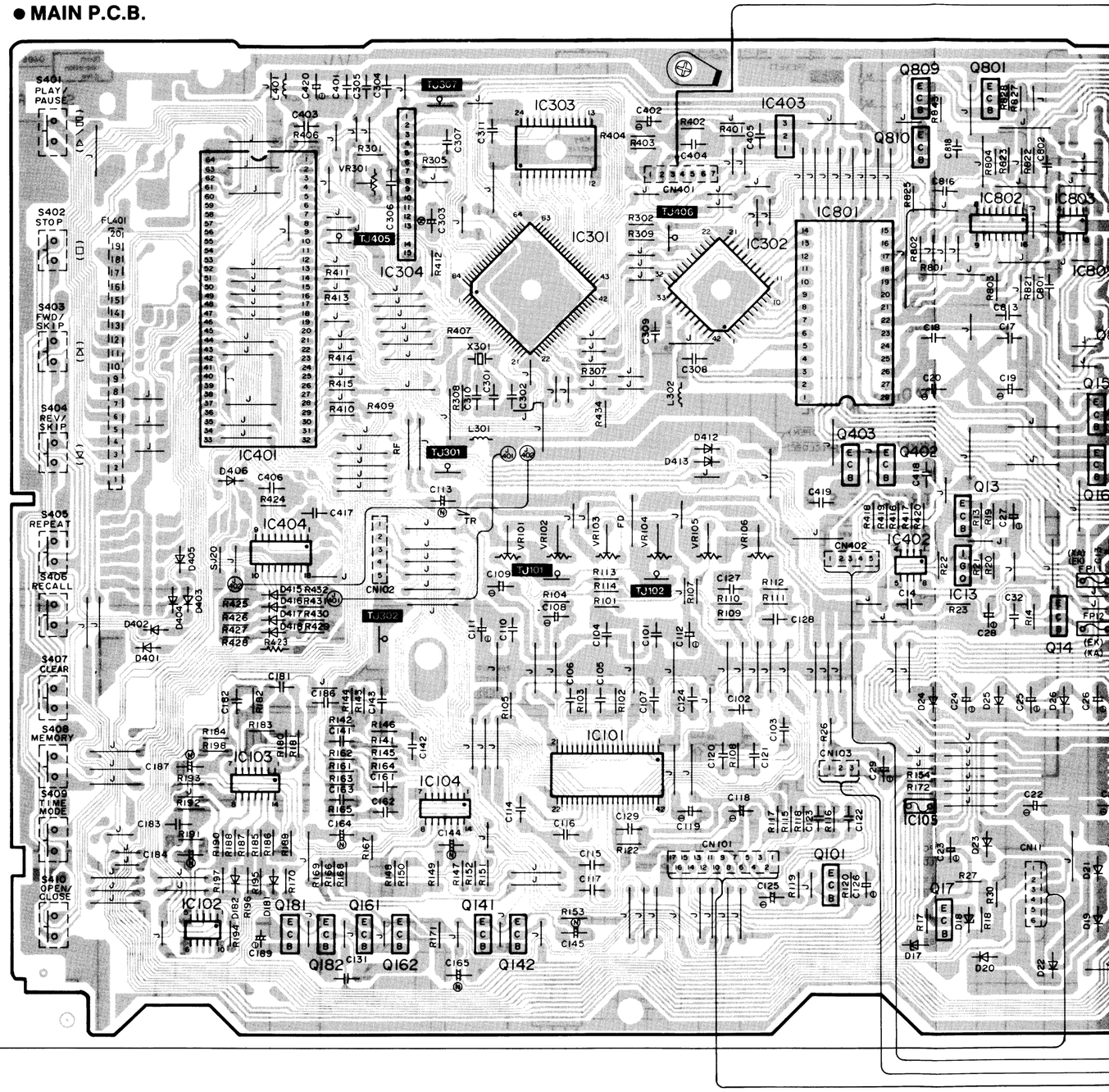
NOTE: For [XL] area the AC outlet and F2 are not provided.

• For [XA], [XB], [PA], [PE] and [PC] areas

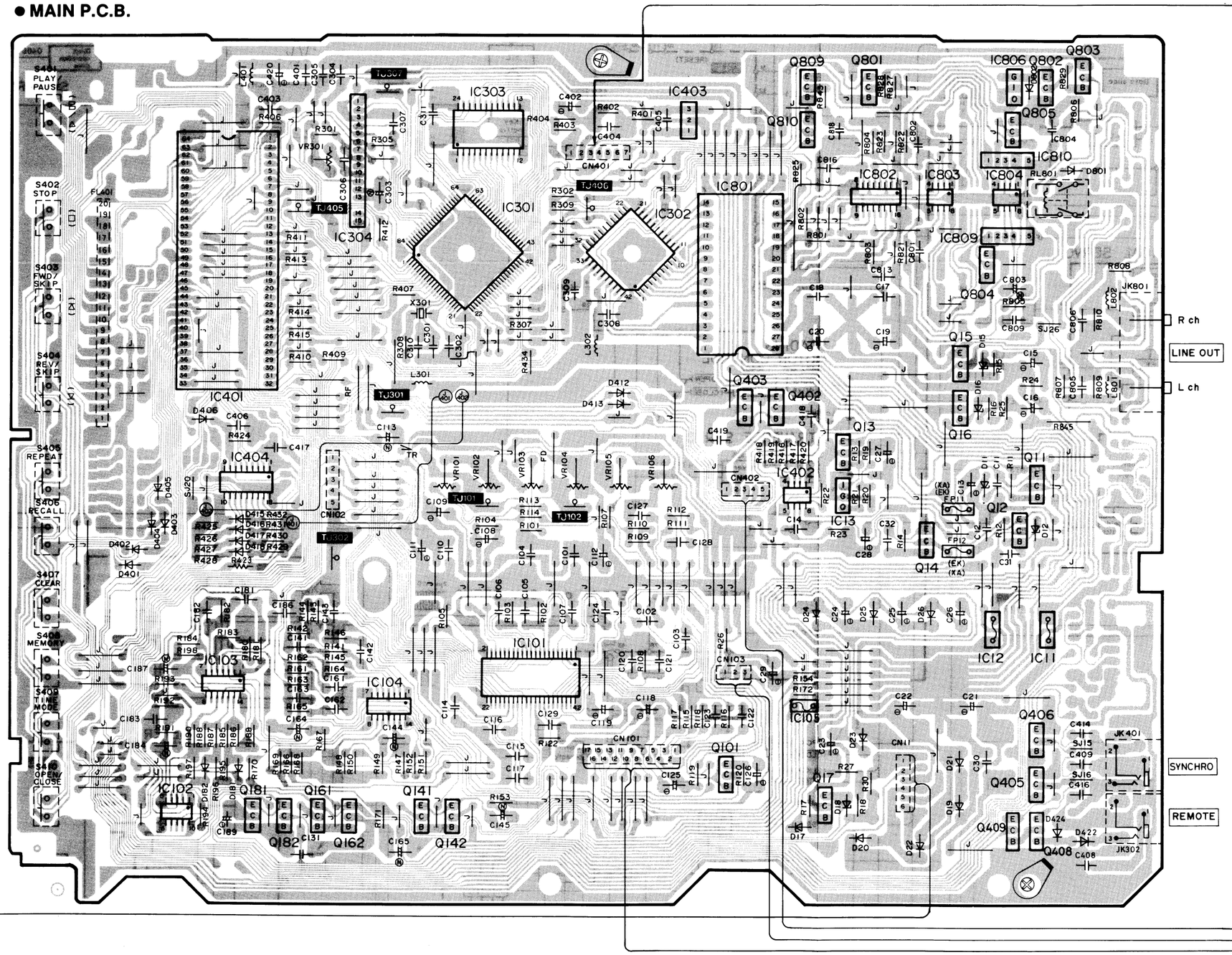


NOTE: For [XB] area the AC outlet is not provided.

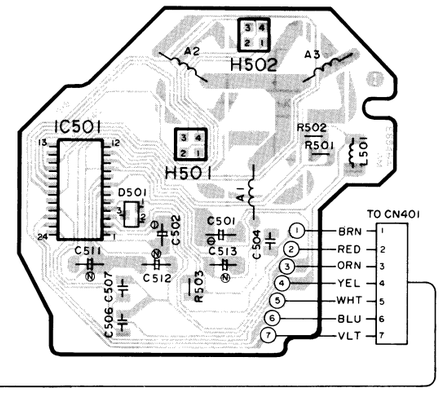
• MAIN P.C.B.

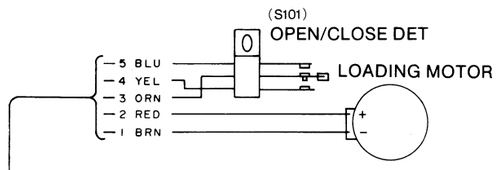


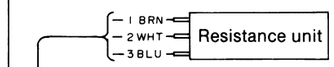
● MAIN P.C.B.

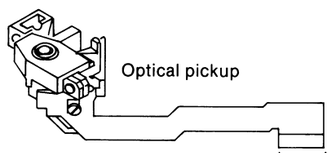


● SPINDLE CONTROL P.C.B.









■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with development of new technology.)

Notes:

1. **S1** : Power switch in "**on**" position.
2. **S101** : Disc holder open/close detection switch.
3. **S401** : Play/pause switch.
4. **S402** : Stop switch.
5. **S403** : Forward skip/search switch.
6. **S404** : Backward skip/search switch.
7. **S405** : Repeat switch.
8. **S406** : Recall switch.
9. **S407** : Clear switch.
10. **S408** : Memory switch.
11. **S409** : Time mode switch.
12. **S410** : Open/close switch.
13. The voltage value and waveform are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
    * The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
14. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
15. ———— : Positive voltage lines and negative voltage lines.
    ⟿ : Audio signal lines.

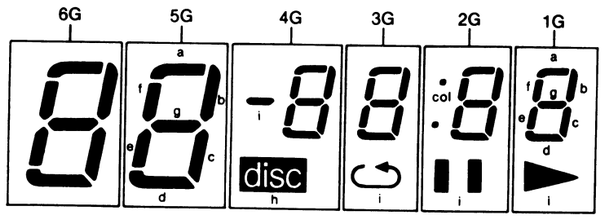
Caution!

IC and LSI are aensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

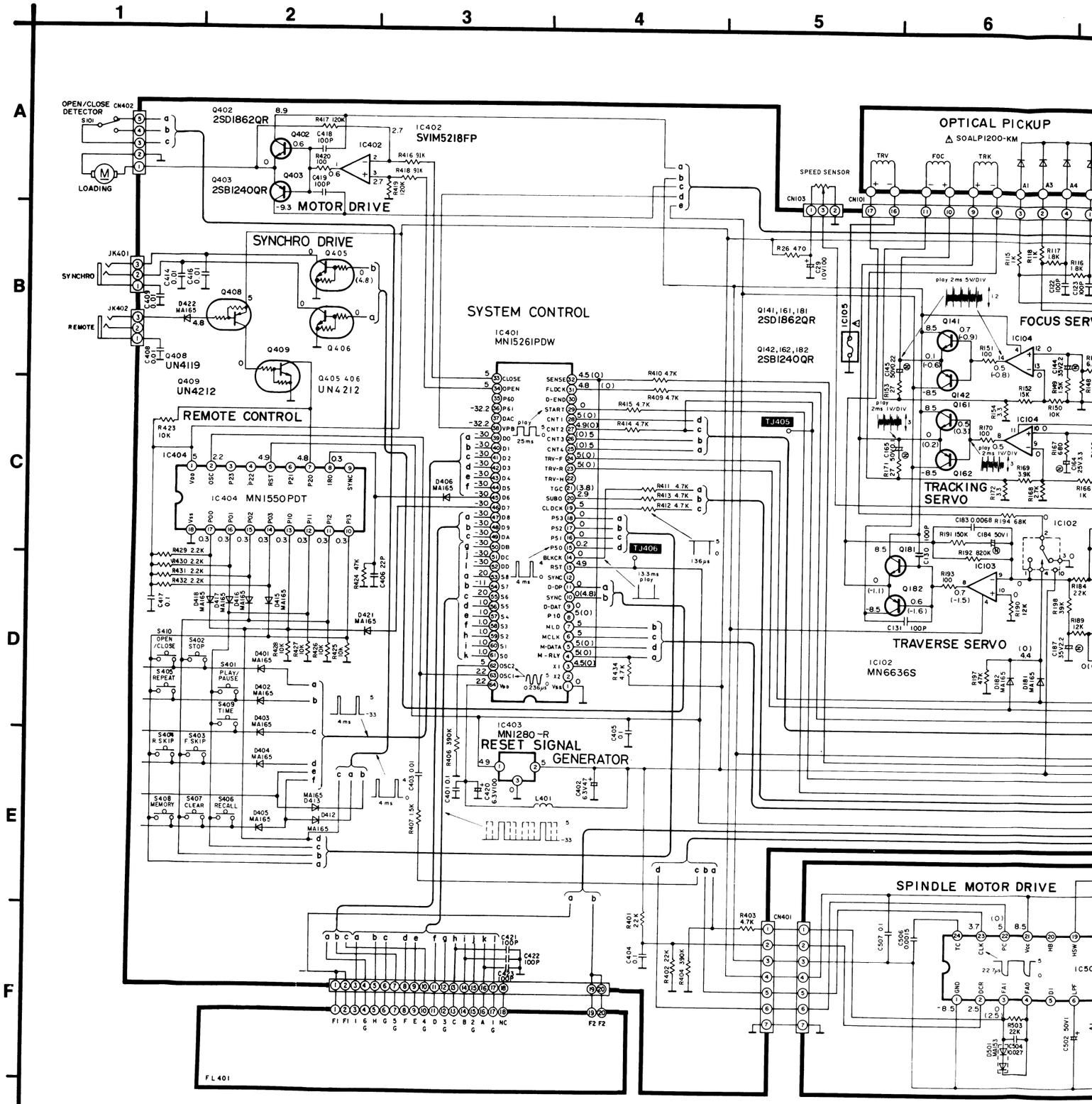
■ Internal connection of FL

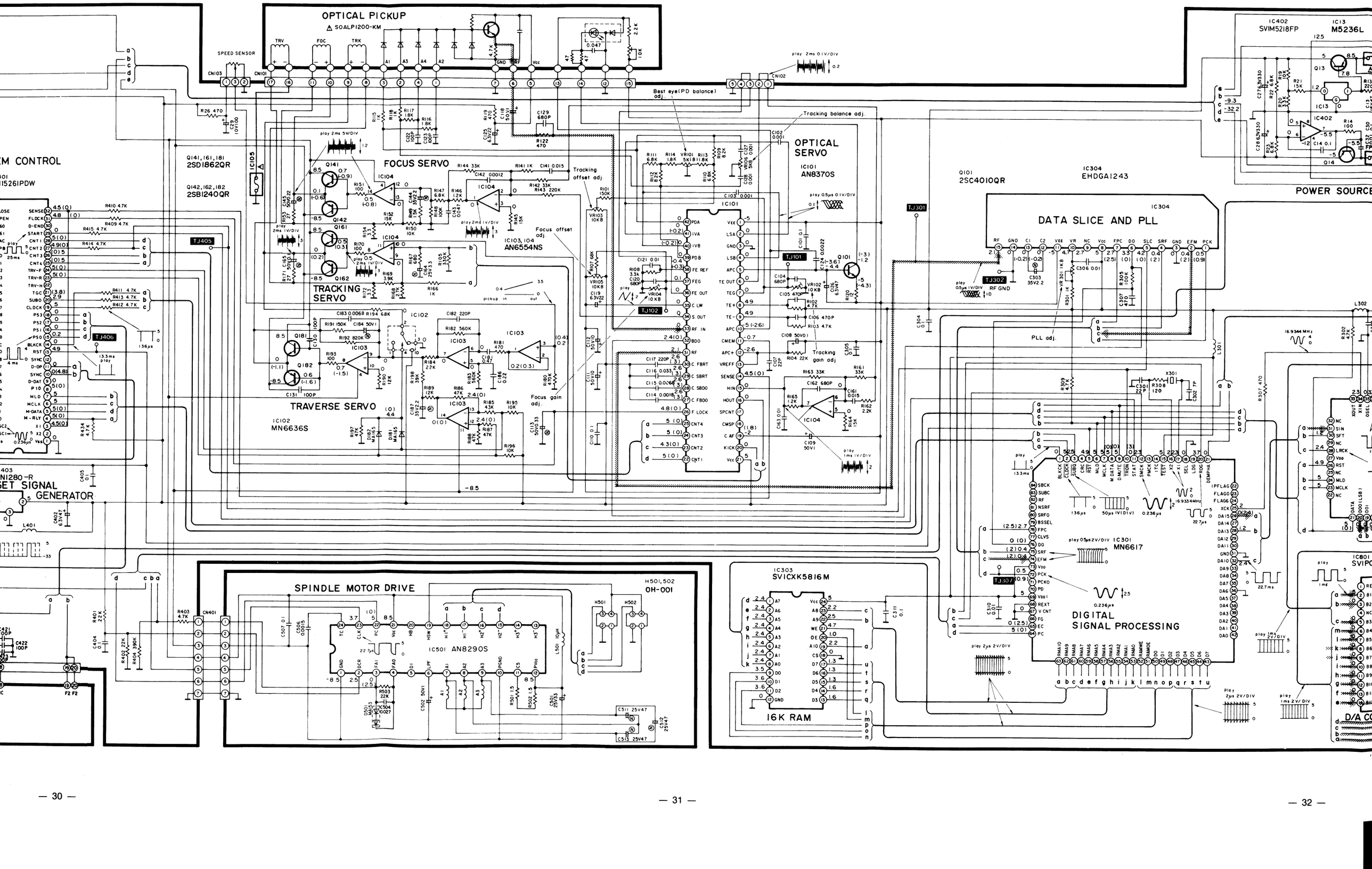
• Grid connection diagram



• Anode connection table

	6G	5G	4G	3G	2G	1G
a	a	a	a	a	a	a
b	b	b	b	b	b	b
c	c	c	c	c	c	c
d	d	d	d	d	d	d
e	e	e	e	e	e	e
f	f	f	f	f	f	f
g	g	g	g	g	g	g
h	-	-	disc	-	col	-
i	-	-	▬	↻	❚❚	▶

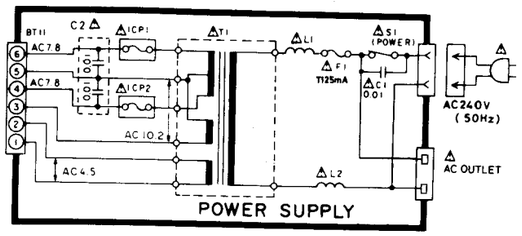



OPTICAL PICKUP
SOALP1200-KM
SPEED SENSOR
CN103
CN101
CN102
TRV
FOC
TRK
A1
A3
A4
A2
GND
RF
Vcc
FOCUS SERVO
TRACKING SERVO
TRAVERSE SERVO
IC102
MN6636S
IC103, 104
AN6554NS
OPTICAL SERVO
IC101
AN8370S
Best eye(PD balance) adj.
Tracking balance adj.
Tracking offset adj
Focus offset adj.
Focus gain adj.
Tracking gain adj
PLL adj.
RF GND
IC304
DATA SLICE AND PLL
IC402
SVIM5218FP
IC13
M5236L
POWER SOURCE
Q101
2SC4010QR
IC304
EHDGA1243
IC301
MN6617
DIGITAL SIGNAL PROCESSING
IC303
SVICXK5816M
16K RAM
SPINDLE MOTOR DRIVE
IC501 AN8290S
H501,502
OH-001
Q141,161,181
2SD1862QR
Q142,162,182
2SB1240QR
EM CONTROL
I5261PDW
SET SIGNAL GENERATOR
NI280-R
TJ301
TJ302
TJ303
TJ304
TJ305
TJ306
TJ307
TJ101
TJ102

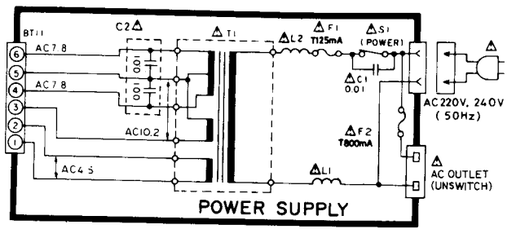
OPTICAL SERVO
IC101 AN8370S
Best eye(PD balance) adj.
Tracking balance adj.
Tracking gain adj
play 2ms 0.1V/DIV
play 0.5μs 0.1V/DIV
Q101 2SC4010QR
IC304 EHDGA1243
DATA SLICE AND PLL
PLL adj.
RF GND
play 0.5μs 1V/DIV
IC303 SVICXK5816M
16K RAM
IC304 MN6617
play 0.5μs 2V/DIV
DIGITAL SIGNAL PROCESSING
play 2μs 2V/DIV
IC402 SVIM5218FP
IC13 M5236L
Q11 2SDI862QR
Q12~14 2SBI240QR
RECTIFIER
POWER SOURCE
Q17 2SAI54TQR
IC11,12 SVIFUI5
Q16 2SBI240QR
Q15 2SDI862QR
For [E],[EG],[EB],[EH],[EF],[Ei] areas
POWER SUPPLY
AC220V/240V (50Hz)
AC OUTLET (UNSWITCHED)
MUTING RELAY DRIVE
IC806 MN1280-S
Q802 UN4113
Q803 2SC3311
Q801 UN4212
Q809 UN4112
Q810 UN4212
Q804,805 2SC3311
IC809,810 SVIGA011
IC804 SVINJM5532M
IC802 SVIUPD4053GI
IC809 FILTER
IC810 FILTER
IC803 SVIM5238FP
SAMPLE HOLD
IC302 MN6618A
DIGITAL FILTER
IC801 SVIPCM54HP-I
D/A CONVERTER
play 1ms 2V/DIV
play 1kHz 0dB
H501,502 0H-001
Lch
Rch
LINE OUT

• Power supply circuit

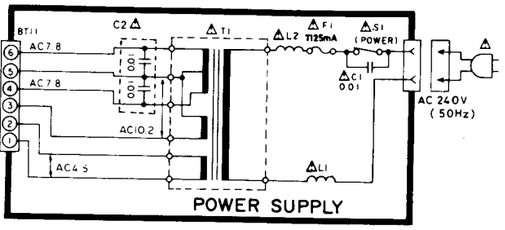
• For [EK] area



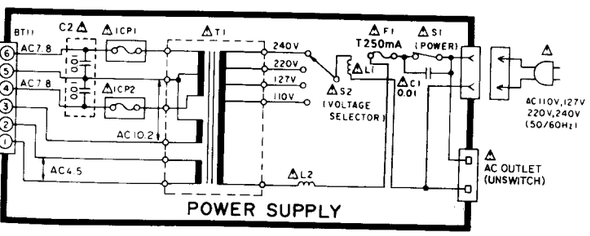
• For [E], [EG], [EB], [EH], [EF], and [Ei] areas



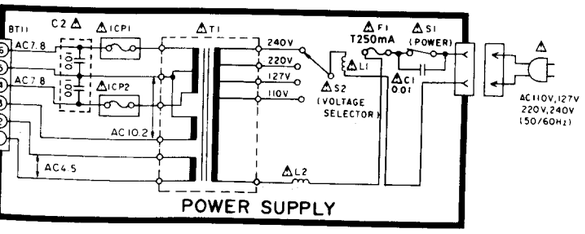
• For [XL] area



• For [XA], [PA], [PE] and [PC] areas



• For [XB] area



■ TERMINAL FUNCTION OF LSI

• MN6617S (Digital Signal Processing: EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
2	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
3	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)
5	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
6	MLD	I	Command load input
7	MCLK	I	Command clock input
8	MDATA	I	Command data input
9	DMUTE	I	Muting control (muting ON at "H")
10	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output
12	SMCK	O	Clock output (4.2336 MHz)
13	PMCK	O	Pitch control clock output (Not used, open)
14	ITC	I	Track counter input signal (Not used, connected to +5V)
15	$\overline{\text{TEST}}$	I	Test mode selection
16	X2	O	Clock output (16.9344 MHz)
17	X1	I	Clock input (16.9344 MHz)
18	SEL	I	DA output parallel/serial selection (serial at "L")
19	LDG/WDCK	O	L channel deglitch signal/serial data word clock.
20	RDG	O	R channel deglitch signal.
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
22	IPFLAG	O	Interpolation flag (interpolation at "H")
23	FLAG0	O	Error flag (error at "H")
24	FLAG6	O	16 K RAM address reset signal (reset at "H") (Not used, open)
25	XCK	O	Clock (16.9344 MHz) output (Not used, open)
26	DA15/ SRDATA	O	16-bit data output/serial data output (MSB first)
27	DA14/ SRDATAX	O	16-bit data output/serial data output (LSB first)
28	DA13/SRCK	O	16-bit data output/serial data beat clock.
29	DA12/WDCK	O	16-bit data output/serial data word clock (Not used)
30	DA11/ BYTCK	O	16-bit data output/serial data byte clock (Not used)
31	GND	I	GND terminal
32	DA10/R/L	O	16-bit data output R/L signal
33	DA9/RESY	O	16-bit data output/ Resynchronizing signal
34	DA8/FCLV	O	16-bit data output/Synchronizing detection signal (Not used)
35	DA7/ IPBYTE	O	16-bit data output/Interpolation flag for each byte (Not used)
36	DA6/IPSEL	I/O	16-bit data output/ interpolation inhibit (Not used)
37	DA5/FLAG5	O	16-bit data output/C2 decoder correction flag 3 (Not used)
38	DA4/FLAG4	O	16-bit data output/C2 decoder correction flag 2 (Not used)
39	DA3/FLAG3	O	16-bit data output/C2 decoder correction flag 1 (Not used)
40	DA2/FLAG2	O	16-bit data output/C1 decoder correction flag 2 (Not used)
41	DA1/FLAG1	O	16-bit data output/C1 decoder correction flag 1 (Not used)
42	DA0/FLCK0	O	16-bit data output/Crystal frame clock
43 ⟆ 50	D7 ⟆ D0	I/O	16 K RAM data output
51	RAMOE	O	16 K RAM $\overline{\text{OE}}$ signal
52	RAMWE	O	16 K RAM $\overline{\text{WE}}$ signal
53 ⟆ 63	RAMA 0 ⟆ RAMA10	O	16 K RAM address signal (RAMA0 : LSB, RAMA10: MSB)
64	PC	O	Spindle motor ON signal (ON at "L")
65	EC	O	Spindle motor drive signal
66	FG	I	Spindle motor FG signal input (Not used, open)
67	VCNT	——	Connected to GND
68	REXT	——	Connected to GND
69	VDD1	——	Connected to +5 V
70	PD	——	Not used, open
71	PCKO	——	Not used, open
72	PCK	I	PLL extract clock input
73	VDD	I	Power supply (connected to +5V)
74	EFM	I	EFM signal input (PLL)
75	SRF	I	EFM signal input (DSL)
76	DO	I	Drop-out signal (Drop-out at "H")
77	CLVS	O	11T servo OK signal (OK at "H")
78	FPC	O	PLL frequency comparision signal
79	BSSEL	O	PLL frequency in take operation signal.
80	SRFO	——	———
81	NSRF	——	———
82	RF	——	———
83	SUBC	O	Sub-code serial output data
84	SBCK	I	Clock for sub-code serial output

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE+	I	Phase difference-to-voltage conversion (+)
9	TE−	I	Phase difference-to-voltage conversion (−)
10	APC−	I	Laser power inversion input
11	C·MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, open)
18	C·MSP	I	Track-cross reference speed setting capacitor connection (not used, open)
19	C·AF	I	Auto focus timer capacitor connection
20	KICK	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	
23	CNT2	I	
24	CNT3	I	
25	CNT4	I	
26	$\overline{\text{F·LOCK}}$	O	
27	C·FBDO	O	
28	C·SBDO	O	
29	C·SBRT	O	
30	C·FBRT	O	
31	RF OUT	O	
32	BDO	O	
33	RF IN	I	
34	S·OUT	O	
35	C·LW	I	
36	FE·OUT	O	
37	FEG	I	
38	FE·REF	I	
39	PDB	I	
40	IVB	O	
41	IVA	O	
42	PDA	I	

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted·from SRF
2	EFM	O	EFM signal output synchronized with PCK
3	D·GND	I	GND terminal (digital system)
4	SRF	O	RF signal output data-sliced into digital value
5	SLC	I	Slice level control signal input
6	DO	O	Drop-out detection pulse output
7	FPC	I	Frequency comparison error signal input.
8	VCC	I	Power supply (connected to +5V)
9	NC	I	
10	VR	I	
11	VEE	I	
12	VC1	I	
13	VC2	I	
14	A·GND	I	
15	RF	I	

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE+	I	Phase difference-to-voltage conversion (+)
9	TE−	I	Phase difference-to-voltage conversion (−)
10	APC−	I	Laser power inversion input
11	C·MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, open)
18	C·MSP	I	Track-cross reference speed setting capacitor connection (not used, open)
19	C·AF	I	Auto focus timer capacitor connection
20	KICK	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)

Pin No.	Mark	I/O	Function
22	CNT1	I	Control input (FOON: Focus servo ON signal)
23	CNT2	I	Control input (TRON: Tracking servo ON signal)
24	CNT3	I	Control input (KICKF: Kick direction [Forward] command)
25	CNT4	I	Control input (KICKR: Kick direction [Reverse] command)
26	F·LOCK	O	Focus lock signal output
27	C·FBDO	O	Capacitor connection for inversion RF high speed detection
28	C·SBDO	O	Capacitor connection for inversion RF low speed detection
29	C·SBRT	O	Capacitor connection for non-inversion RF low speed detection
30	C·FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RF IN	I	RF signal input
34	S·OUT	O	Focus search signal output
35	C·LW	I	Capacitor connection for triangular wave generation
36	FE·OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE·REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current to voltage conversion (B)
41	IVA	O	Current to voltage conversion (A)
42	PDA	I	Photo detector current input (A)

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted·from SRF
2	EFM	O	EFM signal output synchronized with PCK
3	D·GND	I	GND terminal (digital system)
4	SRF	O	RF signal output data-sliced into digital value
5	SLC	I	Slice level control signal input
6	DO	O	Drop-out detection pulse output
7	FPC	I	Frequency comparison error signal input.
8	VCC	I	Power supply (connected to +5V)

Pin No.	Mark	I/O Devision	Function
9	NC	I	VCO free ran frequency adjusting current input (not connected)
10	VR	I	Resistor connection for VCO oscillation frequency
11	VEE	I	Power supply (connected to −5V)
12	VC1	I	Capacitor connection for VCO oscillator frequency
13	VC2	I	Capacitor connection for VCO oscillator frequency
14	A·GND	I	GND terminal (analog system)
15	RF	I	RF signal input

• MN15261PDW (System Control and FL Drive)

Pin No.	Mark	Signal	I/O	Function
1	VSS	GND	I	GND terminal
2	XO	—	O	Not used (Open)
3	XI	SENSE	I	Optical servo condition input
4	P00	PC	O	Spindle moter control
5	P01	M DATA	O	Command data outut
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	MRLY	I	Muting control
9	P11	D-DAT	I	(Not used, open)
10	P12	SYNC	I	(Not used, open)
11	P13	D-DP	I	(Not used, open)
12	SYNC	—	O	(Not used, open)
13	RST	RESET	I	Reset signal input (reset at "L")
14	IRQ	BLKCK	I	Sub-code block (Q data) clock (75 Hz) input
15 ~ 18	P50 ~ P53	KEY	I	Key scan input
19	SBT	CLDCK	I	Sub-code frame clock (7.35 kHz)
20	SBD	SUBQ	I	Sub-code Q data input
21	P20	TGC	O	(Not used, open)
22	P21	TRV-H	O	(Not used, open)
23	P22	TRV-R	O	Traverse reverse command signal
24	P23	TRV-F	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)

Pin No.	Mark	Signal	I/O	Function
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
30	P41	D-END	O	Connected to 5V
31	P42	FLOCK	I	Optical servo condition (focus) input
32	P43	SENSE	I	Optical servo condition (track cross) input
33	PE0	CLOSE	O	Loading motor close signal
34	PE1	OPEN	O	Loading motor open signal
35	P60	PAUSE	O	(Not used, open)
36	P61	PLAY	O	(Not used, open)
37	DAC	DAC	O	(Not used, open)
38	VPP	—	I	FL drive power supply (connected to −32V)
39 ~ 52	D0 ~ DD	—	O	FL grid signal and key scan signal
53 ~ 61	S8 ~ S0	—	O	FL anode signal
62	OSC2	—	I	Clock terminal
63	OSC1	—	I	Clock input
64	VDD	—	I	Power supply (connected to +5V)

• MN1550PDT (Remote Control Signal Processing)

Pin No.	Mark	Signal	I/O	Function
1	VDD	——	I	Power supply (connected to +5V)
2	OSC1	SMCK	I	Clock input
3	P23	——	——	Not used, open
4	P22	——	——	Not used, open
5	RST	RESET	I	Reset signal input
6	P21	——	——	Not used, open
7	P20	——	I	Remote control signal input
8	IRQ	——	I	Program enable/de-enable control

Pin No.	Mark	Signal	I/O	Function
9	P31	SYNC	O	Not used, open
10 ~ 13	P13 ~ P10	Data	I	Key strobe
14 ~ 17	P03 ~ P00	Data	I	Key strobe
18	VSS	GND	I	GND terminal

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n-inversion RF
n-inversion RF
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• MN15261PDW (System Control and FL Drive)

Pin No.	Mark	Signal	I/O	Function
1	VSS	GND	I	GND terminal
2	XO	—	O	Not used (Open)
3	XI	SENSE	I	Optical servo condition input
4	P00	PC	O	Spindle moter control
5	P01	M DATA	O	Command data outut
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	MRLY	I	Muting control
9	P11	D-DAT	I	(Not used, open)
10	P12	SYNC	I	(Not used, open)
11	P13	D-DP	I	(Not used, open)
12	SYNC	—	O	(Not used, open)
13	RST	RESET	I	Reset signal input (reset at "L")
14	IRQ	BLKCK	I	Sub-code block (Q data) clock (75 Hz) input
15 ~ 18	P50 ~ P53	KEY	I	Key scan input
19	SBT	CLDCK	I	Sub-code frame clock (7.35 kHz)
20	SBD	SUBQ	I	Sub-code Q data input
21	P20	TGC	O	(Not used, open)
22	P21	TRV-H	O	(Not used, open)
23	P22	TRV-R	O	Traverse reverse command signal
24	P23	TRV-F	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
30	P41	D-END	O	Connected to 5V
31	P42	FLOCK	I	Optical servo condition (focus) input
32	P43	SENSE	I	Optical servo condition (track cross) input
33	PE0	CLOSE	O	Loading motor close signal
34	PE1	OPEN	O	Loading motor open signal
35	P60	PAUSE	O	(Not used, open)
36	P61	PLAY	O	(Not used, open)
37	DAC	DAC	O	(Not used, open)
38	VPP	—	I	FL drive power supply (connected to −32V)
39 ~ 52	D0 ~ DD	—	O	FL grid signal and key scan signal
53 ~ 61	S8 ~ S0	—	O	FL anode signal
62	OSC2	—	I	Clock terminal
63	OSC1	—	I	Clock input
64	VDD	—	I	Power supply (connected to +5V)

• MN1550PDT (Remote Control Signal Processing)

Pin No.	Mark	Signal	I/O	Function
1	VDD	——	I	Power supply (connected to +5V)
2	OSC1	SMCK	I	Clock input
3	P23	——	——	Not used, open
4	P22	——	——	Not used, open
5	RST	RESET	I	Reset signal input
6	P21	——	——	Not used, open
7	P20	——	I	Remote control signal input
8	IRQ	——	I	Program enable/de-enable control
9	P31	SYNC	O	Not used, open
10 ~ 13	P13 ~ P10	Data	I	Key strobe
14 ~ 17	P03 ~ P00	Data	I	Key strobe
18	VSS	GND	I	GND terminal

• MN6618A (Digital Filter)

Pin No.	Mark	I/O	Function
1	NC	—	Not connected
2	D012	O	16-bit data output
3	D011	O	16-bit data output
4	D010	O	16-bit data output
5	GND	I	GND terminal
6	D09	O	16-bit data output
7	NC	—	Not connected
8	D08	O	16-bit data output
9	D07	O	16-bit data output
10	NC	—	Not connected
11	NC	—	Not connected
12	D06	O	16-bit data output
13	D05	O	16-bit data output
14	D04	O	16-bit data output
15	D03	O	16-bit data output
16	NC	—	Not connected
17	NC	—	Not connected
18	D02	O	16-bit data output
19	D01	O	16-bit data output
20	D00	O	16-bit data output
21	MDATA	I	Command data input
22	NC	—	Not connected
23	MCLK	I	Command clock input
24	MLD	I	Command load input
25	NC	—	Not connected
26	$\overline{RST}$	I	Reset signal input (reset at "L")
27	—	—	————
28	R/L	I	L/R channel changeover signal
29	NC	—	Not connected
30	SFT	I	Serial data input clock
31	SIN	I	Serial data input
32	NC	—	Not connected
33	X OUT	O	Clock output (Not used, open)
34	X IN	I	Clock input (16.9244 MHz)
35	OSEL	I	DA output parallel/serial changeover (Parallel at "L")
36	LDGL	O	L channel deglitch signal
37	RDGL	O	R channel deglitch signal
38	VDD	I	Power supply (connected to +5V)
39	D015	O	16-bit data output (MSB)
40	D014	O	16-bit data output
41	NC	—	Not connected
42	D013	O	16-bit data output

• AN8290S (Spindle Motor Drive)

Pin No.	Mark	I/O	Function
1	GND	I	Minimum potential of IC control. (In this unit, it is connected to VEE [−8.0V])
2	DCR	I	Standard voltage of FAI, PC, CLK. (In this unit, it is connected to 2.5V.)
3	FAI	I	Torque command filter amp. input. (Normal rotation command when FAI < DCR.)
4	FAO	O	Filter amp. output.
5	DI	I	Absolute value circuit input.
6	LPF	I	Capacitor terminal for low pass filter of current feedback loop.
7	A1	O	Drive signal output.
8	A2	O	Drive signal output.
9	A3	O	Drive signal output.
10	PGND	I	Minimum potential of IC power. (In this unit, it is connected to VEE [−8.0V])
11	CS	I	Drive current detection resistor terminal.
12	PVCC	I	Power input for IC power.
13	NC	I	Not used in this unit.
14	NC	I	Not used in this unit.
15	H2−	I	Negative output of Hall element is input.
16	H2+	I	Positive output of Hall element is input.
17	H1−	I	Negative output of Hall element is input.
18	H1+	I	Positive output of Hall element is input.
19	HSW	I	Bias switch of Hall element. (OFF when PC > DCR)
20	HB	I	Bias power of Hall element.
21	VCC	I	Power input for IC control.
22	PC	I	Power control. (Power down mode when PC > DCR)
23	CLK	I	Clock input. (DCR standard, operated at the edge of rise.)
24	TC	I	Triangular wave generation capacitor terminal.

Printed in Japan
S870406800JN/HS
S870600500JN/HS
S870700700JN/HS

ORDER NO. HAD8711083P9

Parts Change Notice

Model No. SL-PJ22

Please revise the original parts list in the Service Manual to conform to the change (s) shown below. If new part numbers are shown, be sure to use them when ordering parts.

Reason for Change *The circled item indicates the reason. If no marking, see the Notes in the bottom column.

1. Improve performance	
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code **The circled item Indicates the interchangeability. If no marking, see the Notes in the bottom column.

	Parts	Unit Production	
A	Original	Early	Original or new parts may be used in either early or late production units. Use original parts until the supply is exhausted, then stock new parts.
	New	Late	
B	Original	Early	Original parts may be used in early production units only. New parts may be used in either or late production units. Use original parts where possible, then stock new parts.
	New	Late	
C	Original	Early	New parts are to be used in both early and late production units. Stock new parts only.
	New	Late	
D	Original	Early	Original parts must be used in early production units. New parts must be used in late production units only. Stock both original and new parts.
	New	Late	
E	Other		

Part Number Information

Model No.	Ref. No.	Original Part No.	New Part No.	Notes(*,**)	Part Name & Description	Q'ty	
SL-PJ22	Q408	UN4119	UN4112	1, C	Transistor	(1)	

Please file this parts change notice with your copy of the Service Manual for model No. SL-PJ22 , Order No.HAD8704113C9.

Technics

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